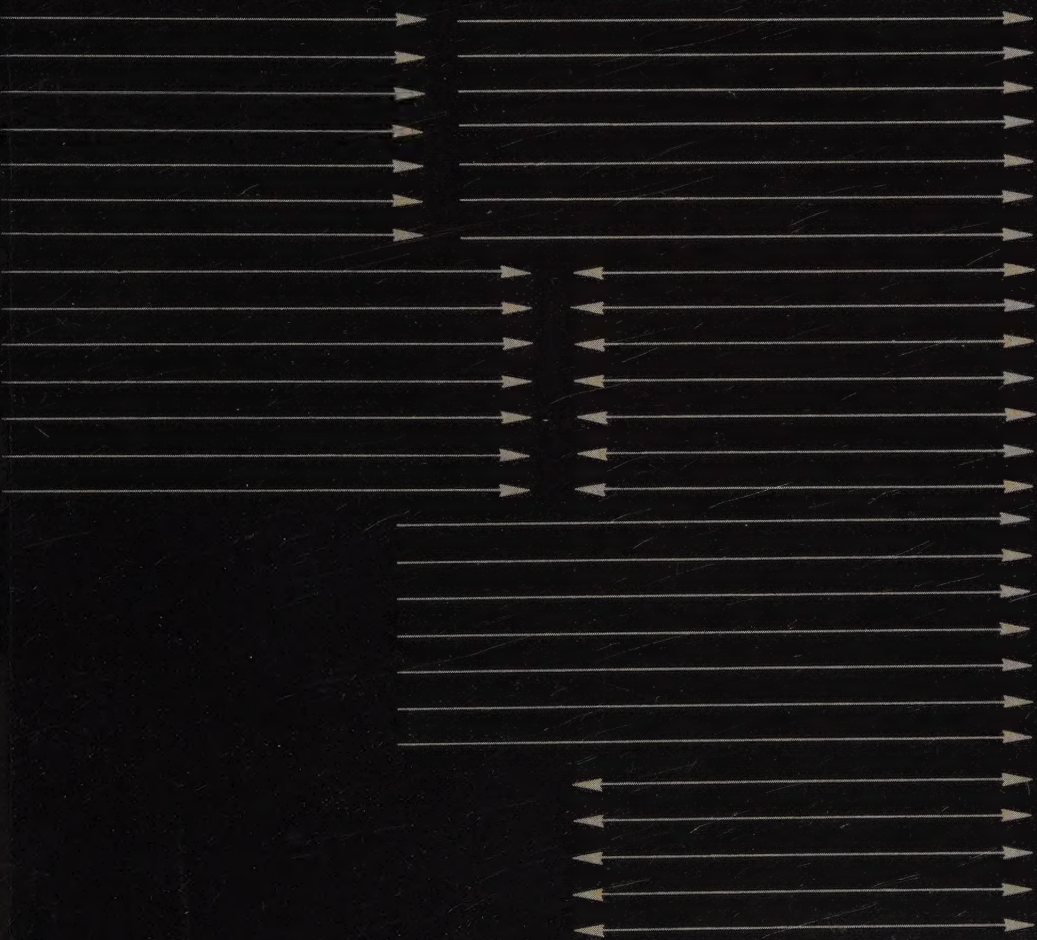


CRISIS WARNING

THE PERCEPTION BEHAVIOR INTERFACE

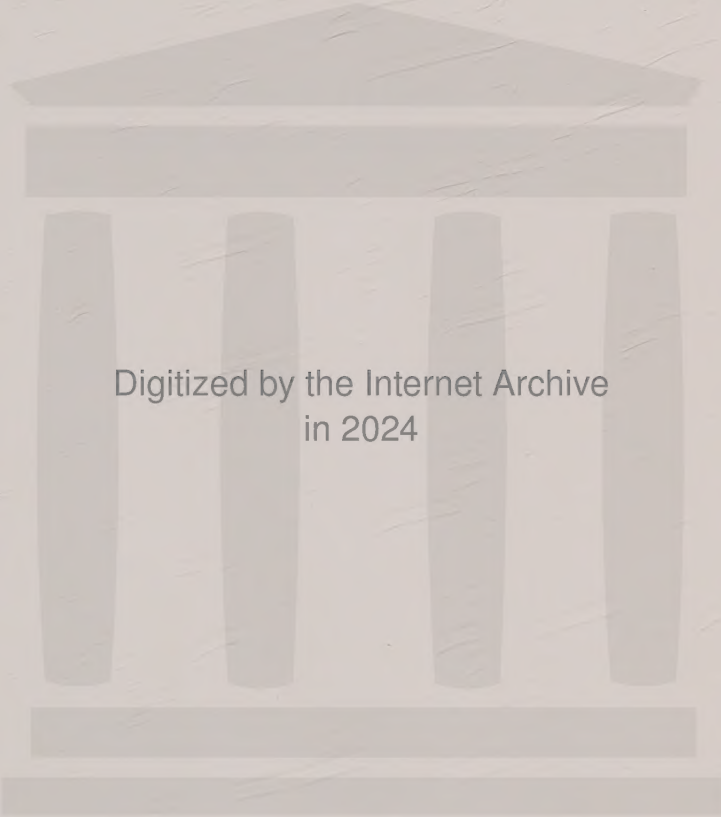
WARREN R. PHILLIPS
AND RICHARD RIMKUNAS



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The Perception Behavior Interface

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The Perception Behavior Interface

Warren R. Phillips and Richard Rimkunas
University of Maryland

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We would like to dedicate this work to Warren's mother

Peg Phillips

who died just a month before she could see
the final product of a son's dreams fulfilled.

The views and conclusions contained in this book are those of the authors and should not be interpreted as necessarily representing the official policies, either expressed or implied, of the Defense Advance Research Projects Agency or the U.S. Government.

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Preface

The research reported on here is the culmination of a three-year effort for the Advanced Research Projects Agency, Cybernetic Technology Office of the Department of Defense and was monitored by ONR under Contract No. N000014-75-C-0846. The charge was to take a look at the feasibility of using current social science methodology to evaluate and make recommendations for change in the current bureaucratic components of crisis management. In addition, we were asked by ARPA to look into the potential applicability of catastrophe theory to crisis phenomena. The work has essentially three components which we believe ought to be contained in all such analyses. The first is a fully formal theory upon which we intend to base substantive conclusions. The second is an empirical examination of the derivatives from that theory. The third is a set of practical policy extensions which we feel are allowed given the degree of empirical analysis presented in the manuscript.

Any three-year effort owes a debt of gratitude to a number of people. We wish to thank those students who have helped us over the three years. These include Robert Crain, Bob Edwards, Bob Warrington, Margee Ensign, and Pat Sobrinsky. Special thanks to Pat Bond, who helped write Chapter IV and did most of the programming, and Bob Flynn, who helped write Chapters III and IV.

Finally, we owe a special debt of thanks to Mary Keener who not only typed the whole work several times but who brought enough "sunshine" into all of our lives to get us over those "heavy" periods.

We wish to thank the Computer Science Center for time granted on the University's Univac 1108 and 1140 computers.

Of course, final responsibilities are still being debated.

Warren R. Phillips
Richard Rimkunas

Chapter I

Introduction

Crises stand at the threshold between war and peace. The “Basic Principles” of detente enumerated in 1972 recognized that both nations must strive to better understand the dynamics of crises and to act both individually and jointly to quickly contain and manage crises in such a manner as to prevent the outbreak of war.¹ Early recognition of a crisis coupled with quick diplomatic and military action can help to moderate hostilities and avoid unnecessary conflict.

But what is meant by crisis management? How can one actually manage a crisis? This has been one of those intellectual footballs that has been bounced around for sometime now.² In general, there are two schools of thought about what it means to manage crises. The first school equates management with the decision maker’s ability to avoid war — pure and simple. This is a risk averse definition which requires decision makers to evaluate the effect of action in terms of the resulting likelihood of war. The decision rule is clear enough: choose the action least likely to create war. Since it assumes that the opponent’s response is important in the calculations, this perspective emphasizes the common interests of participants.

The second school of thought lies at the opposite end of the spectrum. Winning is now the sole objective and war is simply one of many strategies open to nations. In this school crises are good things because they define the limits of an opponent’s commitments and spell out the freedom of operation open to a skilled player.

In order to understand crisis management in today’s world, we must seek a marriage of both; winning is the objective, but within very tight bounds. These boundaries totally eliminate the desirability of nuclear war. While this desirability *can* be eliminated, the accidental, tragic occurrence cannot be as readily prevented. Crisis management is essentially an attempt to balance this contradiction. It is intended to be a set of procedures which seeks a mutually advantageous (positive sum) solution without going to nuclear war.

The national decision process in response to crisis is generally the same whether the time requirement for decisions is a matter of hours, days, or months. The President and his principal national security advisors seek information, intelligence, and policy recommendations from as many command and

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staff levels as time permits. There is an automatic chain reaction throughout the various channels and levels of the several departments and agencies as they are queried by those above them. Information on each potential crisis situation is shared with the staffs and departments responsible for collecting and distributing information. Plans for coping with the crisis are formulated by policy elements in the several departments and agencies. Various levels of government are included in the decision processes so as to coordinate both functional tasking and the collection of information through successive levels of the decision hierarchy.

In the Department of Defense, for instance, there are seven functions in crisis management:

- (1) **Indications Monitoring**
... provides the means for continuous appraisal of the current world situation by regular staffs during normal working hours and by operations center watch personnel at all other times. Incoming information is examined for events and trends which differ from the normal state-of-affairs, resulting in notification to higher authority of a possible crisis situation.
- (2) **Initial Crisis Assessment**
... is initiated by notification of a significant change from the norm. The result of this activity is determination of whether or not a crisis exists. If one exists, it is evidenced by intensified monitoring and analysis, and the initiation of response planning. In making this initial crisis assessment, interaction may take place between this function and the threat assessment function and/or the damage assessment function, as appropriate to the situation.
- (3) **Threat Assessment**
... includes evaluation of all possible consequences of the crisis situation. Potential enemy objectives, intentions, status of forces, and capabilities are assessed. If we have suffered damage, the implications of the losses on our economic, political, and military posture are evaluated ... (T) these activities may require the retrieval of pre-stored data or the acquisition of new information in light of changed conditions. Finally, this function involves communication of the overall threat assessment to those engaged in response option planning and other concerned (agencies).
- (4) **Damage Assessment**
... consists of the activity which spans the duration from the time of first receipt of reports of damage sustained to United States' and/or its allies' resources, until after communication regarding the extent and specifics to those who are, or may become, concerned with the effects of the damage. It involves inspection, transmission, and receipt of damage reports, determination of the cause and perpetrator, and the numbers and kinds of things lost or degraded. It also involves determination of who can best provide information and who should receive what portions of the assessment.
- (5) **Resource Analysis**
... involves responding to requests for information generated by the (response) planners as to what resources are or can be made available for use or expenditure in executing potential response options.
- (6) **Response Selection/Execution**
... is the process of deciding to execute one or more recommended response options,

including military, economic, and diplomatic or a combination of the three types, or rejecting all, and directing additional planning, possibly with new planning factors or objectives . . . Response Execution is the transmission of orders as to what actions are to be taken and the carrying out of the actions ordered.

(7) Crisis Monitoring

... is initiated simultaneously with the Execution phase of the Response Selection/Execution function; it provides feedback to Response Planning and inputs to the Damage and Threat Assessment and Resource Analysis functions. Crisis Monitoring differs from Indication Monitoring; it concentrates on the evolution of events generated by Response Execution with regard to this situation only, whereas Indication monitoring continues evaluation of all other incoming day-to-day information.³

An important factor to keep in mind is that functional relationships exist at every level (Washington, unified commands, and actual on the scene commands) of the organizational structure to be supported by a crisis management system. Activities related to crises will necessitate interactions and communications between levels as well as functions. Identical functional organizations at multiple levels in the crisis management system may all be involved in a single activity either independently or jointly. The flow of information within each level is depicted in Figure 1.1.

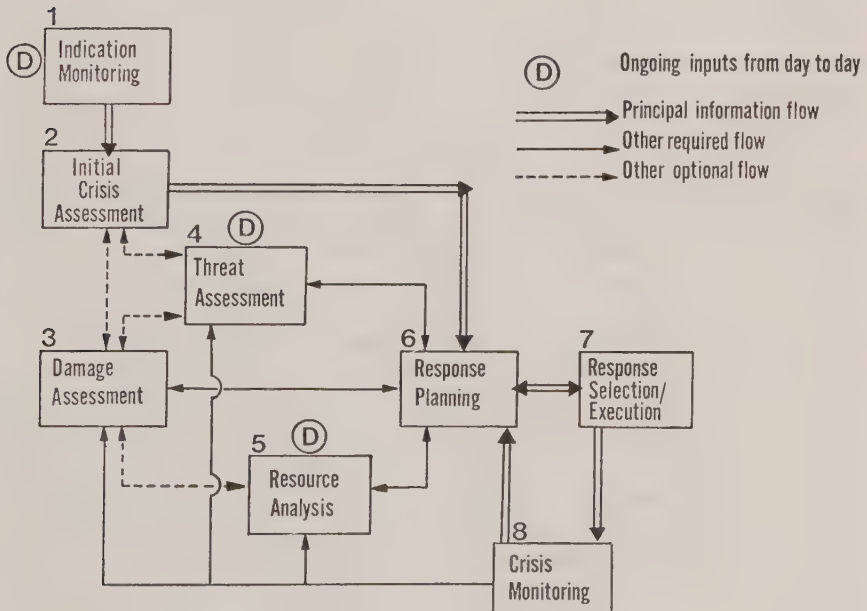


FIGURE 1.1 Crisis Management Major Functions

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In part this flow is the assignment prerogative of the President. The day-to-day functions of *indication monitoring* (1) provide the means for continuous appraisal of the current situation by regular staff during normal working hours and by operations watch personnel at all other times.

The initial crisis assessment function (2) is initiated by notification of a significant change from the norm. The result of this activity is a determination of whether or not a crisis exists. If one exists, it is followed by intensified monitoring and analysis and initiation of *response planning*. In making this *initial crisis assessment*, interaction may take place between this function and the *threat assessment* function or the *damage assessment* function, as appropriate to the situation.

The *damage assessment* (3), *threat assessment* (4), and *resource analysis* (5) functions are performed in support of the *response planning* function (6). The outputs of *response planning* are recommended response options together with estimated costs and risks.

The *response selection/execution* function (7) is the process of deciding to execute one or more recommended response options including military, economic, and diplomatic and/or a combination of the three types, or rejecting all and directing additional planning, possibly with new planning factors or objectives. All the functions previously mentioned support the *response selection/execution* function. Once the decision maker has made his decision as to what action (response option) to execute, the execution phase comes into play. *Response execution* is the transmission and execution of orders or commands.

The crisis monitoring function (8) is initiated simultaneously with the execution phase of the *response selection/execution* function; it provides feedback to *response planning* and inputs to the *damage and threat assessment* and *resource analysis* functions. *Crisis monitoring* differs from indication monitoring in that it concentrates on the evolution of events generated by *response execution* with regard to this situation only, whereas *indication monitoring* continues to evaluate all other incoming day-to-day information.

After a crisis situation is recognized (*initial crisis assessment*), the situation is continually assessed by the *response planning* function and the *response selection* function. The control functions (planning, selection/execution, and monitoring) are iterated until the crisis terminates either autonomously or following negotiations and execution of a termination plan. In a very real sense, this configuration of crisis functions is an ideal type and does not quite fit the actual configuration in any single crisis. This is true because each crisis is unique both in terms of the problems it presents and the particular state of the administration it meets.

Phil Williams sums up the concern which must remain in crisis management:

... it seems almost inevitable that any attempt at the management of super power confrontations will prove troublesome. In one sense, therefore, the notion of crisis management is almost a contradictory one. It is an attempt to manage what may be unmanageable, to control the uncontrollable. Manipulating and influencing the opponent while simultaneously controlling events and avoiding war is a daunting task. But it is a task that must be carried out, since the only alternatives in the contemporary world may be annihilation or surrender.⁴

There is a real need to deal with the control problems abundant in an unfolding crisis. Approaches for simplifying the command structure need to be developed to ensure that national command authorities can become involved in crises while the daily operations of monitoring and responding to the international environment are maintained. DOD Directive 5100.30 creating the World Wide Military Command and Control System (WWMCCS) was a move in this direction. The WWMCCS improves communications and proposes a computer internetting (using common software programs in sharing data bases). A major objective of WWMCCS is to simplify the decision process. Not only do we need solutions like WWMCCS, but we also need new procedures and better analysis of the impact of information for responding to crises. The problems center on assuring an appropriate mixture of the flow of information, intelligence, and policy actions. General Ralph highlights the difficulties in applying control networks such as WWMCCS:

Implementation Problem –

Past command, control, and communication networks have been unable to meet adequately the information needs of the tactical commander. Vast amounts of data were generated at the execution end of the chain of command, but strategically sensitive details were often buried in a mass of 'noise.' That fundamental problem is still with us. Advances in selected communications technology have occurred so rapidly that information is assembled at rates beyond the current ability to transmit, process, or use. Software capabilities are inadequate to evaluate the data against criteria of immediate concern to the commander, nor can information be reprocessed and displayed in a manner consistent with battle dynamics.⁵

In crises, decision makers are short on knowledge, time, and other resources, and they must contend with competing interests. The danger of war is ever present! It stems from three separate aspects of crisis behavior. The first of these dangers rests in deficiencies or defects in the decision making mechanics of participant states. In addition, there are certain dangers intrinsic to a system when it shifts into crisis which are uncontrollable by member states. Finally, there are risks inherent in the environment in which nations must operate. This book is addressed to each of these three problems.

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A. The Problems of Perceptions

To a large degree what happens in crises is simply an accentuation of problems inherent in the decision making process at all times. Facts have to be translated into data relevant to decision making. This process is a complex and difficult administrative process which includes selection and interpretation at a number of levels in the decision hierarchy. There are, however, certain characteristics of this process which are peculiar to crises.

In crisis, and despite increased attention given to the problem, misperceptions are greater, perceptions become more stereotyped, every action of the enemy is interpreted to substantiate the theory that aggression was always the intent of the enemy, belief systems become closed and alternative policies unrealistic, the administrative processes by which facts are examined are by-passed to secure quick decisions, facts that do not support policies are disregarded and their purveyors treated as hostile agents, advisors are those who give the advice that is wanted, priorities lead to the neglect of matters not related to the crisis, power becomes centralized and intimidation of parties with opposing views increases.⁶

The standard routine for dealing with problems in any foreign policy bureaucracy is to select a policy mix or set of actions, given a set of goals. But in crises such procedures are impossible. The command authority is short on knowledge, time, and other resources and is faced with competing needs. Making decisions is difficult for several reasons:

- objectives are not always clear-cut;
- it is usually the case that several alternative methods for attaining a given set of objectives are possible;
- uncertainties seem abundant and pervasive particularly in those cases where lead time is expansive.

In order to perform efficiently, decision makers must be able to call for information from the environment and from history.

The Pueblo incident is an example of the problems a crisis can pose to the national decision making process. It dramatized the problems presented to a decision maker who, under severe time constraints must formulate a plan, locate resources and initiate action all under considerably less than optimum certainty of controlling events.

There had been no properly coordinated contingency plan due to the walls between the Services, and between the intelligence community and the Services. It took too long for the news to traverse the PINNACLE/CRITIC chain (classified systems for electrical communications) to the White House and, when it did, the information was garbled. The lack of rapid, reliable, secure conferencing (on all levels) was a constant handicap here, as in many other crises. The White House lacked the realtime information it should have had or been able to get. The Enterprise's lack of response also could have been rectified by rapid access to data.

Finally, the 'people,' especially the officers and crew of the *Pueblo*, could have been selected, trained, and exercised with better judgment and attention to the crisis-potentialities of the mission.⁷

But what lessons from history are to help us interpret current information even when it is available? An analyst, assigned to monitoring developments in a particular region of the globe, brings to that task certain preconceived images of how events are to be interpreted in that part of the world. In the foreign policy bureaucracy, these images are developed in large part by the agency experience of the analyst.⁸ It is clear today that the three major agencies involved in crises management (State, Defense, and CIA) are very different organizations. But what is the impact of these differences on very different organizations? And, what is the impact of these differences on crisis management? We know that the effects come from the processes in which:

- information is received, processed, and presented to decision makers
- situations get recognized as having certain implications imperative for US action.

We know from recent experiences that a number of problems exist with the transmission and interpretation of information about the likelihood of a conflict leading to a crisis. Certainly crises can arise with such speed that we do not recognize early signals of an impending clash. But all too frequently communication, early analysis, and action have been faulty. Messages have been sent to the wrong location as in the Liberty incident in the Middle-East.⁹ There has been a failure to integrate information received at various points in the system (Pearl Harbor) and the perceptions and interpretations of various analysis groups have differed widely as to the meaning of developments. These differences have been due to different information received (the assassination of Nhu), to different agency interpretations (Bay of Pigs) or to a simple inability to follow what was developing in the field and in the diplomatic arena at the same time (Santo Domingo).

The problems seem to suggest that we need to look carefully at the manner in which signals get received at each of the agencies involved in warning, and at the role agency perspectives play in the process. If noticeable differences exist, as we fully expect, what are the dangers and opportunities available?

In order to study these aspects of the warning process, our concerns must shift from modeling the external activities of the outer environment to modeling the structure of information processing within crisis warning systems. Useful models of governments must go beyond preserving the input-output relationships to also characterizing the manner in which information is transformed into interpretations of the outer environment and then into reaction. Consider the watch officer in State, Defense, or CIA. His job is to monitor incoming messages

in order to recognize impending crises or other threats to US involvement. In the Defense Department, this watch activity takes place within the National Military Intelligence Center (NMIC) under the auspices of the Defense Intelligence Agency (DIA). The State Department maintains its watch activity within its Operations Center, and a similar activity occurs in the CIA's Operations Center. It is important to recognize that each agency goes about its task in a slightly different fashion. Each warning office has its own unique mode of operating and its own peculiar positions to protect and project into the decision process.¹⁰ For instance a reading of several of the popular accounts of agency perspectives suggests that the military senses most readily, crises as imminent threats to American military activity or sovereignty which can be countered by immediate limited US military actions. The State Department sees threats to US commitments and/or past precedents which would involve unilateral or multilateral diplomatic initiatives. The CIA is sensitized by potential forces which might endanger the status quo at some future point in time for which preventive action is necessary now.¹¹ Since most crises involve political, military and intelligence components, it is important that the national security process integrate, in some fashion, information and interpretation from a wide variety of sources. This is necessary for early evaluation of the downstream impacts of activities taken in the warning phases of any crisis.

In normal pre-crisis periods, each of the watch officers will receive — through their individual warning system — large quantities of information and judgmental data, directly or indirectly applicable to a potential situation being assessed. If the sources of the information are different, divergent interpretations or assessments may easily be made because some essential elements of the situation may not exist at one watch or may be neglected in the data from which assessments are being made by that component. The action planning groups at each agency will need to coordinate, compare and interrelate their assessments in order to provide a firm basis for action, to avoid conflicting actions, and to achieve maximum effectiveness.

So now the question becomes how are differences in agency perspective, in baseline information against which current information is evaluated, in information sources, and in the ordering sequence of information received, likely to effect the warning process? In order to understand the impact of variations, on reorganizational efforts like WWMCCS, we need more detailed understanding of the structure of the process envisioned in Figure 1.1 than we currently possess. But while the process must provide for more detail in the delineation of structure, it must also abstract more of the process itself in order to maintain a manageable analysis perspective.

B. The Shift from Day-to-Day Routine to Crisis Behavior

Consider a hypothetical sequence of events in the CIA watch officer's duty. He comes to work early on a Tuesday night (2 a.m.) and begins reading cable traffic coming in from the North-South Korean border. There is a report alleging that North Korean soldiers violated the DMZ between North and South Korea, felled trees, started forest fires, and herded apparently diseased cattle into South Korea before fleeing across the DMZ. He calls a conference of other watch officers immediately to see if they have corroborating evidence. His counterpart in Defense points out that South Korean troops have been ordered to follow the raiders back across the DMZ and retaliate. They left two hours ago but no one has heard from them for over an hour. The State Department office points out that there has been a series of high level diplomatic meetings between the North Korean and the Chinese and Russians. He says that the Russians have apparently remained in Pyongyang, the North Korean capital, but the Chinese went home after less than a day's meeting.

While the three watch officers are discussing whether others should be notified, the military officer says he just received information that the South Korean patrol has been repulsed by a much larger North Korean force coming down through the DMZ. At this point all three officers break up the conference and make reports to superiors including estimates of the threat, decision time, and uncertainty.

The immediate response to such a report is a shift in the operating procedures for dealing with a sequence of events. Analysts will be dispatched to assist watch officers, thereby developing Crisis Alert Teams (CATS), the Secretaries will set up briefings on a regular basis in their situation rooms and the President will be notified. If the action continues and escalates, the threat of a commitment of US forces may be envisioned and the initiation of a conference among the secretaries and the President will be called.¹²

Several points are worth abstracting from this scenario. The shift from non-crisis reporting to a crisis mode of behavior exhibits several intriguing forms of behavior. One inherent characteristic of this shift is that sudden changes are observable from pre-crisis, standard operating procedures to the particular form of crisis response chosen for this situation. The pattern of sudden change is difficult to forecast in that small changes in the exterior state of world affairs occasionally create dramatic shifts in the behavior exhibited in response. For sometime now students of crisis have recognized this point. McClelland (1968 p. 160) defined crisis as "in some way, a change of state in the flow of international political actions." Hermann has included in his definition of crisis the concept of surprise. "In order for a crisis to occur," argues Hermann (1969), "the bureaucracy must be surprised."

... A crisis is a situation which disrupts the system or some part of the system (that is, a subsystem such as an alliance or individual actor). More specifically, crisis is a situation that creates an abrupt or sudden change in one or more of the basic systemic variables. (Hermann, 1969, p. 411)

A system faced with a crisis may shift from its normal mode of functioning into a crisis mode of functioning. As part of this change, the tempo of interaction among system components may increase, communication patterns may be altered, and the decision making processes may be modified. Under normal conditions one component might be dominant, but under crises conditions another might become dominant. (Scott, 1967, p. 216)

Edward Azar has pursued this notion of shift further by developing the concept of the normal range of behavior (1972). He argues that a set pattern or a normal range of behavior in the exchange between two nations is relatively easy to discern. For Azar, a nation becomes involved in crisis only when it passes a critical threshold point in behavior sent and received. These ideas of crossing threshold points and concomitant shifts in behavior will be an important part of our development of a model of crisis response.¹³ These special situations are not amenable to standard statistical description because such descriptions are not adequate for describing sudden transition and divergence as is commonplace in the shift from standard operating procedures to crisis operating procedures. Thus previous approaches to stimulus response explanation in international relations cannot help us develop the concept of response to crises. Several simple "behavior begets behavior" models have been developed in the literature at this point in time. Phillips (1977) has attempted to explain the response of one nation to another as a simple input-output model mediated by domestic action, uncertainty in the signal and the actions of third parties in the process. Holsti, North, and Brody (1968) have suggested that the matching of input and output is controlled by perceptual variables of hostility and friendship. A problem inherent in both approaches was the assumed structural stability of the explanations linking behavior received and sent. Unfortunately, we know only too well that the receipt of a given signal is not responded to similarly across all situations. But to capture this contextuality is to identify the alternative structures for matching input to output and the algorithm for change of internal states of the system.

Philosophically we want to argue that it is the concept of structural stability that lies at the heart of science. The experimental method is an attempt at defining the elements of a recognizable system (one that is structurally stable) and then manipulating a set of control variables to identify what combination of inputs will alter the structure of the system under examination. But it is the manipulation of these control variables which can (we argue ought to) alter the structural stability of the system.

In any state determined system, the behavior of a variable at any instant depends on the values which the variable and the others have at that instant. If one of the values behaves as a step function the rule still applies: whether the variable remains constant or undergoes a change is determined by the value of the variable and by the values of the other variables. So, given a state determined system with a step mechanism at a particular value, all the states with the step mechanism at that value can be divided into two classes: those whose occurrence does and those whose occurrence does not lead to a change in the step mechanism value. The former are its *critical states*: should one of them occur, the step function will change value. (Ashby, 1966, p. 11)

The experimenter's goals are to find the important variables and their trigger points in order to fully understand the make up of the system under study.

The study of crises is therefore best understood as the study of a natural experiment. It is the job of the researcher to define the important control variables of the national system and then through historical evaluation find the trigger points of these variables which alter the system and thereby create a crisis. Once the trigger points are known, we can ask a series of questions concerning the impact of changing the structure of the warning process on earlier triggering and on more reliable triggering of the crisis management system.

One important by-product of this mode of conceptualizing structural stability in one's models is its similarity with a tropistic perspective. The dynamics of the system are visualized as dependent upon some bombardment of stimuli, generally beyond the control of the system itself. This, we argue, is an excellent analogy for the warning system in crisis.

C. Environmental Constraints

We have emphasized internal constraints on crisis management up to this point, but we have not yet dealt with environmental or historical constraints. Today, by most accounts, we appear on the threshold of a new, perhaps recurrent, era. We are witnessing a lesson of the ideological conflict that has governed international politics in the 60 years since the Russian Revolution in 1917. The world has reacted against this form of perpetual instability. The rise of the philosophy of national self-determination justifies the existence of states with their own political form, peaceful coexistence and the very tenuous power balance of detente.

Now that East-West confrontation is no longer the *raison d'être* for statesmen, what will take its place? The answer seems clear, economics and natural resources. The North-South dialogue, the oil crisis, the Middle East question are all covered by the new framework. But the new framework is not new at all!

The basic evolving issue is, as it was in the eighteenth century, the requirement of raw materials. The raw materials lists are different but the existence of the lists energizes international power struggles today as it did then.

This implies that the post-World War II era or system with its big power confrontation and its power distance between the big powers and the Third World died with the victory of local imperialism over distant imperialism on the Indochina peninsula and in the topsy turvy short term success of the oil embargo. The apparent cataclysmic destruction of post-war images was probably long in coming and rooted elsewhere in the dynamics of the system, but it does give one pause to reconsider.

The change in environment probably reflects the softening of ideological antagonism between East and West more than it does the results of conflicts in Vietnam. But it also signals a challenge to those who would maintain this apparent but ephemeral stability. Be careful: very careful. The new concern, perhaps best recognized by Henry Kissinger is that the working out of relations between the Third World and the major powers might present the major nations with the possibility of being drawn into conflict and major war over competition for resources in far off areas.

From a conflict management perspective, it appears clear that future conflicts are likely to take on a new configuration. Our polycentric world will be facing further fragmentation. Old quarrels over territory, seas and straits, and control of populations will be augmented by conflicts arising from economic warfare. Many of these conflicts will occur in remote land and sea areas but many have spillover implications for Europe and other developed areas. This means that the challenge is to understand how incidents are likely to lead to crises in this new system. The challenge is immense. If we do not avoid, minimize or quickly terminate conflicts, we are likely to be involved in a dynamic situation no leader wanted but whose outcomes are as inevitable as those following from the death of Archduke Ferdinand in 1914.

Crises are the manifestations of conflicts originating from opposing policies pursued by nations. Several academics have suggested that crises are a product of competing exchanges between nations. Burton (1968) asserts that the progression toward war depends upon the equal contributions from both sides, each being governed by perceptions of threat. North and his colleagues (1968) assert that war may occur in a number of ways, but the changes of its occurrence are increased by the hostility in a crisis atmosphere generated by the joint exchanges of parties involved. Zinnes (1968) has been concerned both with the expression of hostility, and its perception and the ensuing responses. These authors will emphasize the process of exchange that underscores the symmetric importance of both participants and actions. Thus, the flow of foreign policy exchanges between nations has certainly been a topic of discussion, debate, and analysis.

But which characteristics of this flow are important for dealing with crises in an efficient manner is not well known. Indeed, we believe that what characterizes crisis behavior has been different over time. The 1948-1955 era with its 'pure' cold war rhetoric, the 1955-1972 era, and finally the post-1972 era have all presented different conditions for crisis decision makers as the participants changed their perspectives and the nature of the game changed. Lessons from these dynamics ought to provide valuable insights into the future world as we see it taking shape today.

How has the international environment changed in the period since 1945? We want to argue that the most important change has been in the normal characterization of the day-to-day state of the international environment. Fluctuation in the sense of threat, the need for speedy action, and the degree of certainty in anticipation of the future action have occurred in this period. These fluctuations have exhibited rather definite patterns and these patterns have strong implications for the type of scenerio which leads to crisis. In particular, we feel that the reduction in the systematic threat of the day-to-day relations between nations since the Cold War era has significantly changed the way nations enter crises. We intend to investigate these hunches further.

D. Conclusion

These then are the dangers of crises:

- 1) Dangers inherent in the decision-making system itself.
- 2) Dangers from the very nature of a shift in structure from day-to-day routines to crisis management.
- 3) Dangers inherent in the environment or shifts in that environment in which nations must act.

This book is dedicated to a better understanding of these dangers and to the recommendation of procedures which may minimize their negative impacts.

Notes

1. "The USA and the USSR attach major importance to preventing the developing of situations capable of causing a dangerous exacerbation of their relations. Therefore, they will do their utmost to avoid military confrontations and to prevent the outbreak of nuclear war. They will always exercise restraint in their mutual relations, and will

- be prepared to negotiate and settle differences by peaceful means. Discussions and negotiations on outstanding issues will be conducted in a spirit of reciprocity, mutual accommodation and mutual benefit." (*Survival*, 1972, pp. 191-192)
2. See Young (1968), Williams (1976) and Snyder (1972) for attempts to define these terms.
3. These functions are official crisis functions not a prescription for good crisis management (see Phillips, 1977, pp. 8-12).
4. Phil Williams, *Crisis Management* (John Wiley and Sons, 1976), pp. 30-31.
5. Brigadier General John E. Ralph, "Tactical Air Systems and the New Technologies" in G. Kemp *et al.*, *op cit*, pp. 29-30.
6. J. W. Burton, *Systems States Diplomacy and Rules* (Cambridge University Press, 1968), p. 77.
7. H. Ware, "New Tools for Crisis Management," *U.S. Naval Institute Proceedings* (August 1974), pp. 19-24.
8. Axelrod (1976).
9. Ware (1974).
10. See Lloyd Etheridge's (1978) Ph.D. dissertation for relevant data on these assumptions.
11. See Pentagon Papers (1976), Marchetti and Marks (1976) or most congressional hearings on crises.
12. The Washington Special Action Group (WSAG) is the current name of the executive committee to advise the President in crises.
13. Mayer says "The underlying axiom of systems analysis (sometimes made explicit while other times left implicit) is that if stress caused by inputs from the environment pass a certain threshold level, the system will break down" (1972, p. 125).

Chapter II

The Research Strategy

A. Crisis Warning

The international environment of the 1980's presents the United States with a new set of issues, albeit a variant upon old themes. The American experience in Vietnam has gone a long way toward raising the threshold of endangered objectives above which events must move before extended US military involvement is likely. At the same time voices are being raised in support of the need for more variety in the forms of coercive diplomacy available to defend US interests in the world. For the first time in recent US history the hegemony of power we have become accustomed to has largely evaporated. Thus, we are now faced with a very different set of prospects for dealing with crises in the 1980s.

Future crises are not likely to be of the nature that defense guidance planners are currently preparing for. Their preference seems to be for contingencies to handle conflicts in the Central European and Mediterranean areas. There is no question that crises in these areas pose serious threats to US interests and commitments. Planners are correct in designing contingencies for them. Nonetheless, it has become increasingly clear that crises in these areas do not represent the largest challenge to crisis management, today.

What of the crises in the third and fourth worlds? Are we prepared to react quickly in far off parts of the world to protect US interests? Moreover, when we must operate in these areas will we have guarantees that we will have allies, basing agreements or overflight rights that were in existence during previous crises in that area? In an era in which cooperation is contingent upon the dynamics of each individual situation, we are going to have to signal much more clearly both the degree of our concern and the unmistakable intent to protect our interests. In addition, we will have to do this frequently without the actual use of military intervention. US decision makers will have to have a number of alternative action sequences available to them and the discipline to pause after signalling long enough for others to respond.¹ The skills necessary to win this game of military chess envisioned for the future will be quite dependent upon the warning process in the bureaucracy charged with national security affairs. The lead time provided by this warning process has got to be long enough to

allow for illumination of the likely consequences of alternative actions. We must be able to maneuver the pieces of the American foreign policy establishment in such a way as to make the most of available time.

An extensive effort has been initiated in the last several years to facilitate the centralized control which is necessary to ensure such discipline. This effort has enhanced the physical apparatus for command, control and communications (C³) during crises. At the heart of this development is the World-Wide Military Command and Control System (WWMCCS), a multibillion dollar attempt to link a series of computers together in such a way as to provide voice, data, and graphic interconnectivity between all nodes in the command hierarchy throughout the world. Essentially this is a communications, storage and display system with analysis capability far beyond the telephone. The technical capacities, as they exist today in this system, have massively boosted transmission volume. But, this volume has placed requirements upon commanders and created dependencies on their part for communication which far out distances their current ability to cope. The problem is one of digestion or of pattern recognition. Current lack of concern for the problem has led to chronic overestimation of the commander's capability to deal with this information at all levels in the command hierarchy.

The current organizational decisions about C³ system characteristics like rationality models are based upon assumptions of rational choice among alternatives as if perfect information were present. Unfortunately, the development of any new organization or system components such as WWMCCS must proceed in the face of:

- 1) incomplete definition of goals and purposes
- 2) incomplete determination of the conditions under which it must operate
- 3) a very large (practically infinite) number of possibilities.

We now have the experience with the WWMCCS and other C³ systems to know that something is amiss in our organizational planning. For this system to assist decision makers and commanders to do a better job, we need to upgrade the processes at each node in the hierarchy whereby:

- information is received, processed, and presented to decision makers.
- situations get recognized as having certain imperatives for US action.

In part, the problem is an image problem. Therefore, research work on individual countries is important as it helps us to see how these countries view crises and how they would respond to US signalling, initiatives or attempts at coercion.² But current difficulties are also in part due to structural problems which require that we carefully rethink our understanding of the American decision process of crisis warning.

What we do know from recent experiences is that there are a number of problems with the transmission and interpretation of information about the likelihood of a conflict leading to a crisis. Certainly crises can appear so suddenly that we do not recognize their early signals. But all too frequently communication, early analysis, and action have been faulty. Messages have been sent to the wrong location (USS Liberty). Information received at various points in the system (Pearl Harbor) has not been integrated and the perceptions and interpretations of various analysis groups have differed widely as to the meaning of developments. These differences have been due to different information received (the assassination of Nhu), to different agency institutions (Bay of Pigs) or to a simple inability to follow what was developing in the field and in the diplomatic arena at the same time (Santo Domingo).

The problems seem to suggest that we need to look carefully into the manner in which agencies involved in warning receive signals and the role agency perspectives play in the process. The intellectual questions which drive this line of research concern structural changes in the flow of information, organizational responsibilities, and horizontal contacts in analysis which affect the warning process and outcome. If noticeable differences exist, as we fully expect, what are the dangers and opportunities involved?

In order to study these aspects of the warning process, our concerns must shift to modeling the internal structure of information processing in crisis warning. Useful models of governments must go beyond preserving the input-output relationships to also characterizing the manner in which input information is transformed into interpretation of the outer environment and then into outputs. This exercise in evaluating American warning procedures implies three tasks:

- 1) a structural analysis of the warning process
- 2) a formal discussion of the relationship between recognition and action
- 3) the development of even more detailed and exact models of the functions being performed.

B. The Warning Process

Belden argues:

The primary objective of intelligence is to acquire information which contributes to warning. However, the warning process goes beyond the sphere of intelligence to impact on the area of decisions and actions. Consequently, warning and crisis operations have a broader series of objectives than often is thought to be the case. These are:

- 1) Avoid or head off a potential crisis situation (crisis avoidance).

- 2) If (1) fails, manage the crisis so as to satisfy national policy objectives without resorting to military force.
- 3) If (2) fails, use conventional military force and diplomatic efforts to avoid long or severe conflict, conventional or nuclear.
- 4) If (3) fails, end the conflict on terms as favorable to our interests as possible before Armageddon.

While the above steps appear to be obvious, it is not clear that our national 'nervous system' is designed for the interactions which must take place among our bureaucracies in order to operate effectively in crisis warning situations (Beldon, 1977, pp. 1).³

Warning implies decisions to take actions. It is thus more than an estimate or forecast of events. It comprises three separable tasks; analysis, decision, and action. Figure 2.1 demarcates this process. Consider the watch officer in State, CIA, or Defense. His job is to monitor incoming messages in order to recognize impending crises or other threats to US involvement. In the Defense Department, this watch activity takes place within the National Military Intelligence Center (NMIC) under the auspices of the Defense Intelligence Agency (DIA). The State Department maintains its watch activity within its Operations Center, and a similar activity occurs in the CIA's Operations Center. It is important to recognize that each agency goes about its task in slightly different fashion. Each warning office has dominant modes of operating and peculiar positions to protect and project into the decision process. For instance, in several of the action reports⁴ it appears to be the case that the military senses most readily crises as imminent threats to American military activity or sovereignty which can be countered by immediate limited US military actions, the State Department sees threats to US commitments or past precedence and compels unilateral or multi-lateral diplomatic initiatives, and the CIA is sensitized by potential forces which might endanger the status quo at some future event in time for which preventative action is necessary now. Since most crises involve political, military and intelligence components, it is important that the national security process integrate, in some fashion, information and interpretation from a wide variety of sources. This is necessary for early evaluation of the downstream impacts of activities taken in the warning phase of any crisis.

In normal pre-crisis periods each of the watch offices will receive, through their individual warning system, large quantities of information and judgmental data, directly or indirectly applicable to a potential situation being assessed. If the sources of the information are different, divergent interpretations or assessments may easily be made because some essential elements of the situation may not exist at one watch or may be neglected in the data from which assessments are being made by that component. The action planning groups at each agency will need to coordinate, compare and interrelate their assessments in order to provide a firm basis for action, to avoid conflicting actions, and to achieve maximum effectiveness.

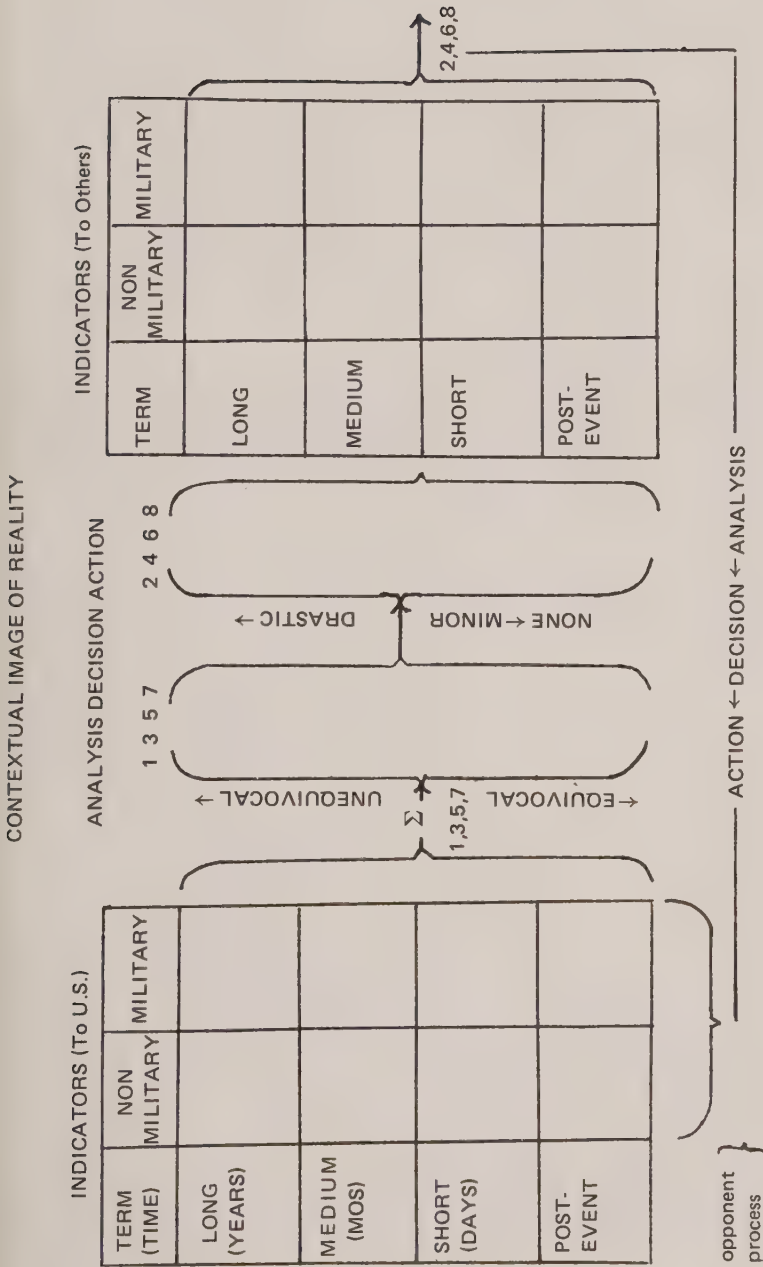


FIGURE 2.1

THE WARNING PROCESS

SOURCE: Belden (1977), Figure 1, page 183. (Reprinted with permission of Sage Publications, © International Studies Association)

Several influences operate on the watch officers in such a manner to present problems for analysis. Candela (1974, pp. 22-27) suggests three major problems. One influence is the negative psychological environment in which the watch officer works. He is to blame if he fails to call an alert when a crisis is imminent, but usually gets no credit if an early alert gives top level decision makers lead time to avoid crisis. A second influence on watch officers is the pressure for consensus within the agency. There is an unwritten pressure for consensus which effectively prevents minority opinions *within* an agency from being expressed. This tendency fosters the development of an agency image of the outer environment.

The final damaging problem is the base line upon which information is interpreted. As Candela (1974, p. 27) points out:

It is considered that good warning analysis should be the product of a detailed and continuing review in depth of all information going back for weeks and months which may be relevant to the current situation, and a sound basic understanding of the potential adversary objectives, doctrines, practices and organizations. In fact, it may be the case that the latest information, despite the necessity of examining it, will often not be the most useful or pertinent to the warning assessment.

So now the question becomes how are differences in agency perspective, in baseline information against which current information is evaluated, in information sources, and in the ordering sequence of information received, likely to effect the warning process? In order to understand the impact of variations, on reorganizational efforts like WWMCCS, we need a more detailed understanding of the structure of the process envisioned in Figure 2.1 than we currently possess. But while the process must provide for more detail in the delineation of structure, it must also abstract more of the process itself in order to maintain a manageable analysis perspective.

We shall argue that whatever else analysts do in crisis management, they are charged with one major task. They must digest all that they feel is relevant from reported events and map this pattern onto three perceptual variables; the amount of threat to US interests, the time available for decision and the uncertainty they have about the interpretation of the situation. These indices trigger others in the crisis management system to interpret the appropriate levels of commitment of US resources and organizational preparedness needed to bring these indicators within acceptable limits or below thresholds. Decisions to commit resources and organizational skills to a problem are made on a regular basis as needed in non-crisis and in crisis periods. But the shift in commitment between pre-crisis and crisis is a very definite change of structure about which we know little. Studies have shown that the shift occurs with considerable irregularity even when expected (Lentner, 1972; Phillips and Lorimor, 1974;

McClelland, 1968). But we do not, as yet, have a clear understanding of the nature of this shift or the role of information in triggering the shift. We argue that organizations like those involved in the national security process have observation interfaces with the outer environment.⁵ These interfaces are the translators of events into indices, meaningful for the current decision algorithm of the system. We recognize that the organizational responsibilities for these two tasks tend to rest with separate groups of individuals at most levels of the command hierarchy. Nevertheless, the operations/intelligence interface made here is an essential aspect of the crisis warning process.

The three perceptual indices of threat, decision time and uncertainty associated with the watch officer's task are not new to the crisis literature. The typology was designed for the situational analysis of actions, with the behavior of the actor being a function of the situation he faces (Robinson, 1962; Hermann, 1969). For Hermann it is the analyst's perception of events in terms of the three dimensions: surprise, threat, and time that distinguish crises from noncrises situations. We have adjusted this trilogy to substitute uncertainty for surprise in an attempt, to more closely represent what we feel are the basic situational indices relevant to the warning process in crisis management. Figure 2.2 is the format for a warning estimate currently employed in the watch offices

FROM:	Information as of:
TO:	Time of Release:
THERE IS A % PROBABILITY THAT:	Identification No.:
1. HOW MANY:	
2. (OF) WHOSE:	
3. WHAT/WHO:	
4. WHERE:	
5. WHEN:	
6. (VERB PHRASE):	
7. HOW MANY:	
8. (OF) WHOSE:	
9. WHAT/WHOM	
10. WHERE:	
11. WHEN:	
12. HOW + CONJUNCTION:	
13. SOURCE(S):	
14. ADDITIONAL INFORMATION:	
15. COORDINATION COMMENTS:	
16. PREPARED BY:	Phone No:

(Security Classification)

FIGURE 2.2
WARNING ESTIMATE

SOURCE: Belden (1977), Figure 9, page 195. (Reprinted with permission of Sage Publications, © International Studies Association)

of the national security bureaucracy. While the format is strictly written in subject (3), verb (6), object (9) and time (11) sequence, it seems clear that the analyzed message seeks to provide threat (1-4, 6, 7-10), time (5 and 11), and uncertainty ("% probability that" column) information to superiors. Conceptually we argue that there is a difference between threat and both decision time and uncertainty. It is threat which creates the crisis system. While uncertainty and decision time are critical in signalling the type of response, threat signals whether or not a crisis response is mandatory. This distinction will become more important in developing a model of crisis decision making.

The behavioral variables also seem straightforward. The first is the commitment of US resources. This ranges from verbal resources all the way through total commitment of military power reserves. The other variable, national command response, fits well into our scheme of linking aspects of the decision system with its behavioral characteristics. While resource commitment acts as a measure of the influence of the system on its outer environment, operating procedures act as a measure of changes in the inner environment to meet the threat. (Belden, 1977) has developed the concept of a stairway to introduce the process of increasing organizational preparedness to face attack (Figure 2.3). The stairway is shown as roughly equal step jumps, but in each crisis the jumps are specific to that crisis.

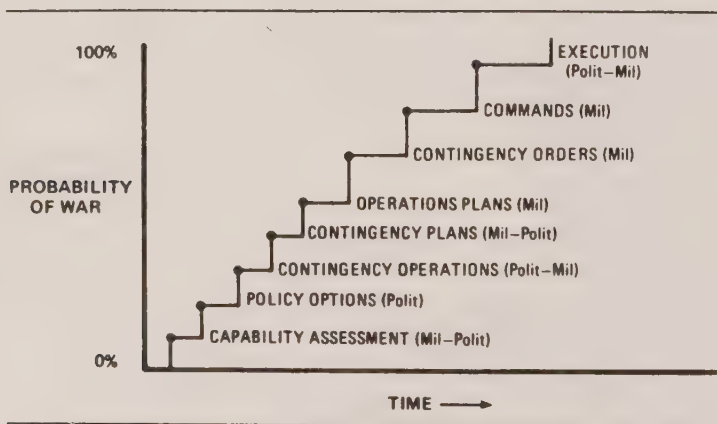


FIGURE 2.3

BELDEN'S STAIRCASE OF OPERATIONAL CHANGE

SOURCE: Belden (1977), Figure 2, page 185. (Reprinted with permission of Sage Publications, © International Studies Association)

In order to put this process together, we argue that the decision process is similar in each agency. The impact of perceptual imagery and the predilection of certain interpretations of events over others does, however, vary from agency to agency. We take the perspective that it is in these interfaces with the outer environment that both the decision maker's understanding of a situation and his decisions to take certain actions take shape. We argue that there are a number of image variations which will effect this warning system. To develop these points we need to present a decision model and a set of procedures for mapping events to perceptions.

C. The Decision Model

As can be seen in our hypothetical example on the North-South Korean border incident discussed in chapter I, the internal organization of the foreign policy process undergoes some structural changes in the shift to crisis. Our perspective divides the international system into two components. These components are the inner and outer environment. The inner environment is composed of the three foreign policy agencies and their functional components. The outer environment is composed of the movement of other international actors.

Decision making is composed of a series of processes. The classical demarcation of each of these steps can be found in Snyder et al (1962). The example in chapter I, however, focuses only on a few of these elements. That is, there is emphasis on information gathering, information sorting, and on changes in the structure of the decision process.

It is important to emphasize a number of points regarding this process. First, information gathering and sorting is primarily a function of the image held by the components of the inner environment. This image is essentially a screening device which allows each agency to grasp the 'important' stimuli in the outer environment and ignore irrelevant data. Images are organization specific. Each of the three major foreign policy organizations have slightly different images and therefore respond to different stimuli.

While the agencies have distinct images, it should be noted that there are some important common elements. These common elements allow for the testing of inner-agency reliability on movement in the outer environment. Agreement between the agencies undoubtedly is related to the degree of threat.

These images not only act as a filtering device. When a stimulus is filtered through the image, it may provide a change in the way further messages are processed. This also has implications for changes in the policy making and execution process. In other words movement in the outer environment, when

viewed as threatening through the image, may force a change in how future decisions are made.

This type of perspective follows those earlier definitions of crisis that emphasize the sudden change aspect of crisis. This change aspect is combined with the idea of threshold points which clearly demarcate the degree of threat and other images that would require sudden change in the inner environment.

This type of perspective incorporates structural change with the idea of a normal range of behavior. If the stimuli from the outer environment is filtered through an agency image and has a 'value beyond some recognized level' it will lead to a change in the processing performed by the inner environment. This change in processing is then a function of both the stimuli and the image. Furthermore, this change is at the heart of what is recognized as a crisis in the operations of the decision making system.

Recently, catastrophe theory has been developed by Rene Thom (1975) and E. C. Zeeman (1976) to describe things that change suddenly, by fits and starts, which have long resisted mathematical analysis. The potential advantages of this perspective and its application to crises is that by considering decision time, threat, and uncertainty about the outer environment, and by looking at the continuum of military responses from complete passivism through war on one continuum and at the staging of command and control procedures in response to crisis from attention directed elsewhere to a full enactment of the Emergency Operating Procedure System on the other continuum, one ought to be able to identify the shift points from non-crisis in terms of the characteristics of the outer environment which trigger them.⁶ Here emphasis will be on typologizing crises by the characteristics of the outer environment and on attempting to account for the apparent stress responses of the system to specific pre-crisis attributes.

Catastrophe theory is a qualitative mathematical model that helps in the description of systems which are characterized by sudden large changes in *behavior*. Rene Thom, the inventor of the method, views these sudden changes as morphogenical changes from a structurally stable position in the behavior field of a system. This idea is closely related to Ashby's idea of a step function (1966).

There are important differences between the Ashby conceptualization of a step function and the Thom conceptualization of catastrophe. Ashby's step function does not specifically deal with a stable equilibrium point. If a step function occurs in the system, a new level of behavior becomes normal. The Thom models posits a stable equilibrium point which the system may [or may not] return to. The return is dependent on the conflict between behavioral attractors of the system. The Thom tropistic maintains that behavioral movement is dependent on forces while Ashby is arguing that behavior is dependent

on goal attainment. But, the important point is that both perspectives are dealing with that important aspect of international behavior – instantaneous/crisis action of an actor.

Thom's conflict models or elementary catastrophes are built around the idea that a system is controlled by a behavioral attractor. Since the system can be defined in terms of differential equations, these attractors are equivalent to local minima in the behavior field. If the system is under the influence of a single attractor, it is structurally stable. When there is more than one attractor, there is the potential for conflict and change in the system. Under the influence of more than one attractor, the behavior of an attribute may take on sudden shifts in direction and appear to be disjointed in its time path. This conflict area – where control of behavior is likely to shift from one attractor to another – is defined in the bifurcation field of the system. The stress involved in this conflict area is relieved when the system meets a critical point. The critical point is that point which provides the instantaneous jump in the behavior of the system. Thom's argument is that through the description of the attractors, the control variables and the critical points we can understand the system better. The resolution of conflict among the attractors is done by the dynamic of the system. A glimpse at the nature of the dynamics of such a system is the potential contribution of Thom's model.

We shall leave the mathematical development of catastrophe theory to other chapters. It is enough here to consider Figure 2.4, the by now famous cusp model of catastrophe theory. In this simplified example we are concerned with input values of the variables, decision time and threat which would cause the behavior of the system to transcend the fold in the behavior surface. We are also concerned with the circumstances which keep the behavior of the system on the top or bottom surface of the fold as well as the circumstances under which it moves from one surface to the other. Thom has developed the mathematics to understand this shifting in behavior to meet apparently slight changes in the outer environment. But there are problems with his approach which must be resolved before we can implement the approach.

The most important problem is finding a way to test a highly qualitative model. Kupperman and Smith (1976) have argued that due to the qualitative nature of the model, all that one can hope for is testing to see if variables move in the same direction the model postulates. While this seems reasonable, E. C. Zeeman (1972) has attempted to test the catastrophe model by forcing it into a more analytical perspective. Zeeman argues that the catastrophe model posits a structure for a dynamic flow of a system. He argues both that this structure can be theoretically developed and that the dynamics of the system can be found.

Zeeman's approach argues that the behavior of a dynamic system can be

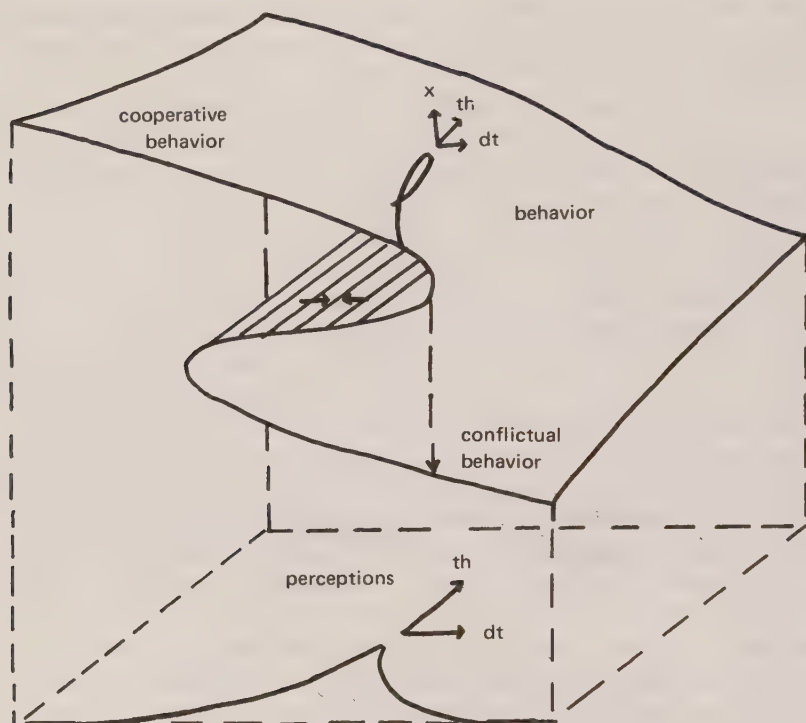


FIGURE 2.4

THE CUSP CATASTROPHE DEPICTING INTERNATIONAL CRISIS

viewed as consisting of fast and slow forces. (It is interesting to note that it is the idea of 'forces' that moves the behavior of the system. Again, we see the influence of the tropistic perspective.) These fast and slow forces can be viewed as vector fields which affect the behavior path of the system. One might visualize a marble on the behavior surface — the fast and slow forces would be those that determine the marble's direction. In this example the marble's vertical movement might be a result of the 'force' of gravity. The horizontal movement of the marble might have been the result of the 'force' of the wind. (This perspective of force fields is not new to Zeeman; it is a traditional way to explain behavior of dynamic systems. For example, see Hirsch and Smalle, 1974.)

A system is structurally stable in two situations. These occur whenever either the fast or the slow forces are equal to zero. When the fast forces are equal to zero there is absolutely no dramatic change in behavior which by definition means the system is structurally stable. When the slow forces are equal to zero

the behavior of the system cannot move out of the influence of the existing attractor. That is, no horizontal movement implies the system cannot reach a critical point and no change can occur.

Structural instability — a crisis — can occur only when there is some interaction between the two forces. Thus in a potential situation, crisis will only occur if both of these forces interact and bring the system to some critical point.

Zeeman has hypothesized in his treatment of these two forces that it is the fast force which creates the dramatic shift of behavior in the system and it is the slow force that eventually completes the circle and brings the system back to the original equilibrium point. It is the combination of these two forces that provides the jump and the return to normalcy.

Having equated threat with the shift variable, a , and decision time with the slow force, b , in Figure 2.5, we can demonstrate the impact of assuming equations for both forces. The equations for both forces represented in three dimensional space of Figure 2.4 are given by Zeeman (1972, p. 38) as:⁷

$$\begin{aligned} \dot{X} &= -(X^3 + aX + b) \\ \dot{b} &= X - X_a \end{aligned}$$

The behavior (X) of the system under a given amount of threat a_1 is given by taking the section $a = a_1$. Suppose that decision time takes values of b_0 in normal times and b_1 in crises. Then $b = b_0$ is the equilibrium point of the system and the triggering of the crisis system moves b from b_0 to a maximum at b_1 . We assume that $b_0 > 0 > b_1$. Under a given threat a_1 the behavior of the system X as will be given by

$$X_a^3 + aX_a + b_0 = 0.$$

To explain the variety of crisis management phenomena, we can draw four sections in Figure 2.5 for four values of $a_1 > a_2 > a_3 > a_4$ corresponding to four hypothetical levels of threat. Notice that in all four cases there appears to be a shift in the perception of the amount of decision time available and an eventual return to normal. In situations where there is apparently high threat in the system, there appears to be a threshold over which behavior falls before it returns to normal. If threat remains zero, or significantly close, no shift in behavior is likely (Figure 2.5a₁). Similarly if decision time never reaches b_1 , the trigger point, there is no shift in behavior. Instead the system returns to normal without exhibiting crisis like actions. Of course variations in the equations and in the assumption $b_0 > 0 > b_1$, will result in a number of very interesting implications for activation of emergency operating procedures. For instance, the return to normalcy since it is controlled by a slow force is a gradual behavioral shift rather than a catastrophe. This provides us with a useful starting

point. It allows for non-crisis movement in the system. This is defined when the fast force is equal to zero. Second, the mathematics of the model argues that all the variables interacting together are necessary for a crisis to occur. Threat may be the variable that places one in the fold in the behavior surface but, its relationship to decision time determines if a jump actually takes place. Thirdly, this perspective allows us to gain a testable model from the catastrophe perspective.

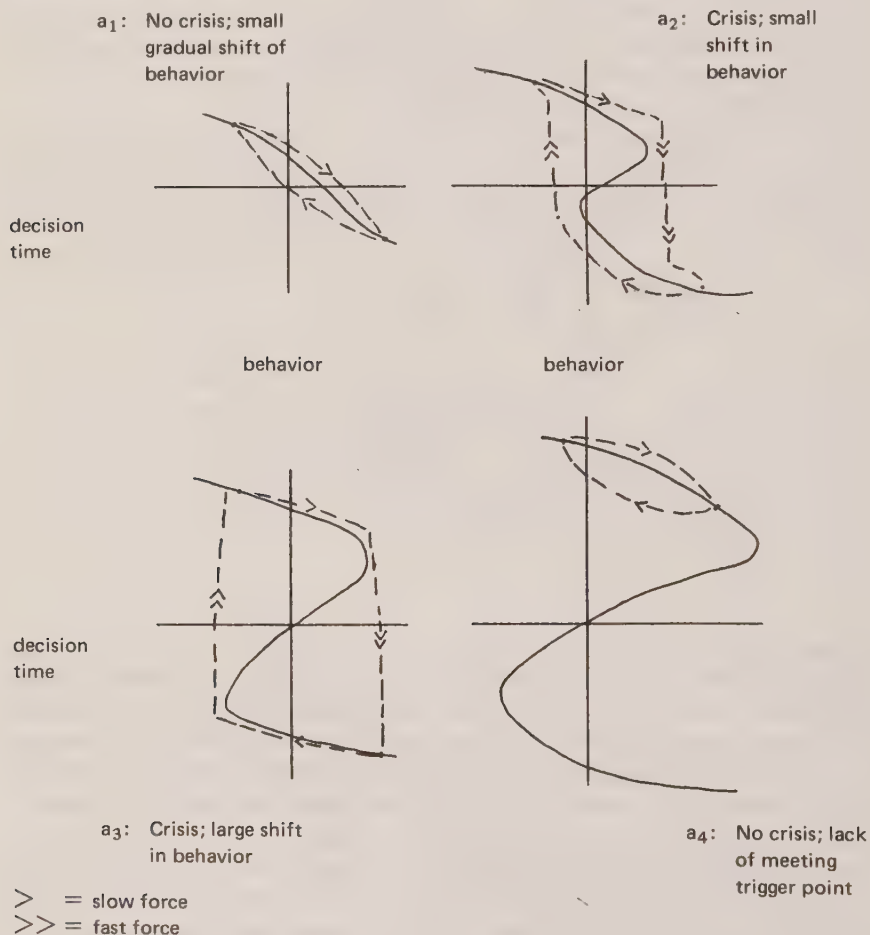


FIGURE 2.5

DYNAMICS OF BEHAVIOR IN THE CRISIS CUSP MODEL

SOURCE: Adapted from Zeeman (1972)

Zeeman (1972) suggests empirical procedures which should provide empirical reference for the model. We fit the data to this canonical surface by juggling the position of the equilibrium point and the functional relations between threat, time, uncertainty, resource commitments and C^3 procedures on the one hand and the empirical references of these variables on the other. From here we need to construct an algebraic equation for threat (the fast equation) to fit the data and to use our theoretical equation for the slow forces of decision time and uncertainty. The procedure guarantees neither a precise fit nor a unique solution but it does provide usable algebraic equations and considerable insight into the underlying dynamics of the crisis management system in the US.

D. Crisis Recognition

Having linked the shift in behavior of the National System to meet crisis to the perception of the outer environment, we now have to develop a methodology for capturing the richness of the contextuality in which events are interpreted by analysts and in which orders are implemented in response to decisions. The methodology envisioned is essentially a series of mapping exercises whereby agencies map events and event sequences onto the three perceptual variables of threat, decision time and uncertainty.

In developing processing rules for the recognition side of our model, four sets of actions can be taken given a report on events. First, watch officers can ignore the message as not signalling any threat. Second, they may wish to wait for more information before alerting superiors. Third, they may confer with others in the watch system to see if they have the necessary information to trigger a CAT. Fourth, they may immediately report changes in threat, decision time and uncertainty.

The development of realistic mappings of each agency is a rigorous and time consuming task. Our first effort was to get a feel for how each of the agencies views the outer environment and what prescriptions for action they prefer. This effort entailed reading congressional minutes, autobiographies, and case histories. Fortunately, this material exists today and is relatively easy to obtain. The next step was the dimensionalization of the three control variables and the two behavior variables. Then comes the arduous task of developing the separate production systems themselves. While this ought to be an interactive process as envisioned in McCormick (1976), it does require a good deal of subjective familiarity with the structure of early warning indicator systems and their translation into estimates of the nature of potential threats.

The way we have developed this mapping from reports of happenings in the outer environment to differential interpretations of their meaning in terms of

threat, time, and uncertainty is to rely on a variant of the events data approach to international behavior. It is our contention that nation/state systems are event processors. They are bombarded by events, respond to them and even relate time to the passage of events more readily than they do to normal clock time systems. Changes in the nature or level of events reported are recognized and responded to by the crisis warning system. Miller and Thorson (1977, p. 62) argue:

... The time schedule governments operate on is generally event-based (that is, governments respond to events in the external environment). These events may have associated with them particular probability distributions. Thus, the notion of time employed in the model should include 'event time,' that is, the 'time flow' against which the system states are plotted should be event based.

The events approach is consistent with our tropistic view of the systems being bombarded by the environment. But in order to translate this view into an operating warning system, we have avoided current index systems such as McClelland's (1976) EFI and ROZ or Andriole and Young's (1977) uncertainty and abnormality indices. We have done this because we feel that warning is more contextually based than current indices seem able to capture. McClelland (1968), for instance was unable to find a predominant pattern to his indices in comparing crises. We believe that these barometer systems will be quite beneficial once they become part of higher order estimating procedures such as suggested by Martin (1976) or as employed by Stewart *et al.* (1977). To get around this problem, we believe what is needed is a richer reporting instrument for recording the context in which situations develop in the outer environment. Indeed, this corresponds with current indicator reporting systems in military intelligence. The major constraint, however, is that too little of the political situation is reported upon. We have developed a code sheet (Figure 2.6) and a self-anchoring scale for analysts which lets them report changes in the level of activity along any of the event indicators. We believe that such a code system could be tied directly (functionally) to any number of event data systems currently available.

Whether the code system is empirically based or subjective, the major concern is with moving from field reports concerning which events are taking place to interpretations of their importance, in terms of threat, time and surprise. It is here that differences in sensitivity to the immediacy of the threat and hidden agendas as to organizational preferences for alternative strategies of action play an important part in orchestrating the warning process.

For us the warning problem is a classical problem in inductive inference. Here the problem is structured in such a way that the target variable hypothesizes about threat time and uncertainty are logically quite distant from the observable events (the data of Figure 2.6). In this case it is usually possible to proceed to link the

	-4	-3	-2	-1	0	1	2	3	+4
USR pol relations with X	-	-	-	-	-	-	-	-	-
PRC " " " "	-	-	-	-	-	-	-	-	-
USA " " " "	-	-	-	-	-	-	-	-	-
USR econ " " "	-	-	-	-	-	-	-	-	-
PRC " " " "	-	-	-	-	-	-	-	-	-
USA " " " "	-	-	-	-	-	-	-	-	-
USR mil " " "	-	-	-	-	-	-	-	-	-
PRC " " " "	-	-	-	-	-	-	-	-	-
USA " " " "	-	-	-	-	-	-	-	-	-
USA mil presence	-	-	-	-	-	-	-	-	-
USR " "	-	-	-	-	-	-	-	-	-
PRC " "	-	-	-	-	-	-	-	-	-
Domestic stability in X	-	-	-	-	-	-	-	-	-
Status of hostile US groups in X	-	-	-	-	-	-	-	-	-
Status of pro US groups in X	-	-	-	-	-	-	-	-	-

FIGURE 2.6

A CODING SHEET USED IN DESCRIBING THE OUTER ENVIRONMENT

two by resorting to intermediate assumptions. Thus, it will often be possible to assess the likelihood of the observed data given an intermediate hypothesis, and the likelihood of that hypothesis given another intervening variable and so on until the desired target is reached (Kelly and Barclay, 1973). Such techniques are called hierarchical cascaded or multi-staged inferences and are approachable from Bayesian inference (Kelly and Barclay, 1973), game theory (Brock, 1971), or production rules (Waterman, 1970). We develop the procedures in a later chapter. For now it is necessary only to see that we have approached the contextual question so important to analysts who attempt to glean meaning from events in the environment as one of making conditional hunches about their meaning and of putting these hunches together in a probabilistic and hierarchical manner which leads to estimates of the threat, decision time, and uncertainty open to crisis management. Differences in the sequences of reporting, the sensitivity to the indicators and the nature of intermediate hypothesis effects the eventual interpretation of events.

Once the two separate models (situation recognition and catastrophe) are developed, we are in a position to integrate their products and develop a series of computer simulations of the impact of different structural changes in the system. We intend to leave the decision mechanisms from catastrophe theory alone and to concentrate on the information flow and behavioral reaction in the

warning phase of crisis management. The effects to be dealt with here are straightforward.

I. *How do agencies differ in their evaluation of the outer environment?*

We believe that the mere increase in volume handling capability envisioned in computer networks such as WWMCCS are an overall detriment to interpretation because they make interpretation more difficult not less difficult. We are certain that the answer is not to avoid WWMCCS but to selectively affect the amount and type of information that reaches each node. In order to be in a position to do this effectively, we must know how each agency perceives the world. What are the differences in the way each agency anticipates threat? Are these dangers or advantages in the current images? How can the early recognition of threat be facilitated?

II. *How does the shift of a crisis operation mode affect crisis management?*

The speed with which agencies recognize crises and the type of crisis they envision affect the procedures they instigate in the management of crises: The shift to crisis in the response to perception of decision time, uncertainty and threat. The magnitude of the shift is a function of complex interrelationships between these variables and the degree of agreement between agencies on the need for action.

III. *What could be the affect of changing the procedures in the watch offices?*

An attempt to identify the trade-offs between duplication versus coordination of tasks will be made. We are concerned with the appropriate mix of time frame and substantive focus. For instance, is a President best served by current procedures and assignments or should he seek a new mix?

The procedures to implement this system are as follows:

I. *Develop mappings of context onto the model.*

- a) Dimensionalize the five variables of threat, decision time, uncertainty, resource commitment, organization preparations.
- b) Identify the crisis indicator nodes for crisis warning.
- c) Produce agency specific mappings of events onto perceptual variables.

II. *Develop a model of crisis warning decision making from catastrophe theory.* This implies:

- a) Identify the applicability of catastrophe theory.
- b) Develop the formal relationship between interpretation of events and behavioral response.
- c) Empirically parameterize the model.

III. *Develop and exercise the model.*

- a) Provide for an interactive capability to change the inputs and the mappings envisioned above.
- b) Run through a set of exercises to address each of the problems delineated above.

Notes

1. See George, *et al.* (1971) and Bobrow (1976) for an extended discussion of these points.
2. Such work as the processing rule models at Ohio State (Thorson, *et al.*, 1975), and the Chinese Analysis at Maryland (Bobrow, 1977) are excellent beginnings in this area.
3. Belden is a member of the Intelligence Community Staff whose principal function is to assist the Director of Central Intelligence. He is personally, deeply involved in the organizational issues of warning and crisis management.
4. See Pentagon Papers (1976), Marchetti and Marks (1976) or most congressional hearings on crises.
5. Terminology developed in Simon (1969), Holt (1978) and Thorson and Phillips (1975).
6. In Emergency Operating Procedures Systems is a multistaged preplanned set of procedures for staffing and operating the National Security actions in crises. It is administered by the Joint Chiefs of Staff and details the order of reporting and coordinating procedures at the crisis area and in Washington as well as the military responsibilities in response to various presidential requests for action during a crisis.
7. These are equations Zeeman (1972) has developed in his article. Rationale for the slow equation is provided in the Zeeman article. These equations will not be used in the treatment of the catastrophe model in later chapters.

Chapter III

The Variables of Crises Management

A. Introduction

The objective of this chapter is to describe in common language form the variables utilized in our attempt to come to grips with the problems in crisis management. The general tone of this chapter is somewhat tentative in its mathematical and empirical precision. Its objectives may be viewed as twofold: first it is designed as an exploratory essay to lay the ground work for providing the necessary information to operationalize the model in its formalized state; and, secondly, it is designed as an exploratory "bridge" between one substantive concern and the operational model of the crisis process, by creating a "real world" nexus as a guideline to aid in the development of a set of decision rules by which the model may be constructed.

There is a need to underscore the guideline aspect of the variable descriptions contained herein. The task is to take each variable separately and to identify and define major classes of behaviors by their characteristics. The effort contained on these pages is to provide a measurement model for the theoretical and empirical flow of later chapters. In short, our interests at this stage are purely descriptive and should be viewed as merely the initial explorations into the substantive nature of the variables.

Before discussing the variables individually, some general comments on the processes involved in crises should prove helpful. Crises all tend to involve drastic, if only temporary, changes in priorities and perceptions and a considerable increase in communications. A vast growth in demands is made upon the principal participants in foreign policy decision making of the countries involved. This creates the stresses of crisis management. The threat of a loss of values imposes pressures to act quickly in light of the newly evolving circumstances.

There seems to be agreement on the substantive definition of crises. Consider the following three attempts:

An international crisis is a confrontation of two or more states, usually occupying a short time period, in which the probability of an outbreak of war between the participants is perceived to increase significantly (Williams, 1976, p. 25).

A crisis in international politics is a process of interaction occurring at higher levels of perceived intensity than the ordinary flow of events and characterized by: a sharp break from the ordinary flow of politics, shortness of duration; a rise in the perceived prospects that violence will break out; and significant implications for the stability of some system (or pattern of relationships) in international politics. (Young, 1968, p. 15).

Specifically, a crisis is a situation that (1) threatens high-priority goals of the decision-making unit, (2) restricts the amount of time available for response before the decision is transformed, and (3) surprises the members of the decision-making unit by its occurrence. (Hermann, 1969, p. 414)

We identify, in this literature, three distinct dimensions to crises: the time available for making decisions, the degree of uncertainty about environmental dynamics and the threat inherent in the situation.

In our conception of crises these are the three variables which help us characterize the outer environment. It is our belief that these are the input variables in a system model which when combined with output variables will enable us to describe in some detail, the shift from day-to-day modes of operation to a crisis mode. But before we go further we must delineate the underlying scale for each of these dimensions.

First, like all attempts at identifying the range of a variable, we intend to develop a set of continuums that satisfy the requirements of total inclusiveness and mutual exclusiveness. All cases of actions and perceptions need be included in the scale, and each must be assignable to a single class or category. However, the classes of events that are characterized as "crisis" consistently demonstrate high degrees of uniqueness. They include the acts of God as well as the acts of madmen and appear with such variability that no general pattern seems viable at first glance. To accommodate this variety in the phenomena, events are labeled and identified in the most generic terms. (Indeed, in the operationalization phase we need to pay close attention to assure ourselves that such zealous devotion does not reduce the salience of some events or perceptions.) However, the dimensions developed below are present in each crisis situation at one level or another and may be decipherable either directly or indirectly from available data. Abstraction to the generic level provides the means for operationalization among the many "unique" cases.

The second point worth emphasizing is that as far as the independent variables are concerned, that is decision time, uncertainty and threat, no point on the continuum represents *the* point at which a crisis situation exists. No single variable is a trigger per se. Crises result from specific value combinations of all three, and are identified by the catastrophe model in Chapter VII. In this connection our intent here is in translating the triggering mechanisms into real world terms (objective 1), and to provide the basis for decision rules based on the combinations and other variations to simulate the decision process (objective 2).

Third, crises inevitably are composed of a number of sequent events. The impact of events on the independent variables (perceptions of decision time, uncertainty, and threat) is such that movement along the scales will most likely occur throughout the crisis period as events unfold. Thus, a crisis situation in total may reveal a number of quite varied perceptions on each dimension, and decision rules — triggers — must be expected to accommodate compilations of specific (or identified) events rather than single events.

Fourth, even though the scales apply to various levels of the involved bureaucratic units, watch officers, president, etc., we assume that the structure is identical throughout, although the interests and experiences at each bureau and level is expected to be different. Thus, though the scales are intended to identify the entire range of possible perceptions for each concept, we expect some variability among the various subjects. While we seek to identify the differences as a major goal of this portion of the project, we expect the scales are applicable to all bureaucracies.

B. Threat

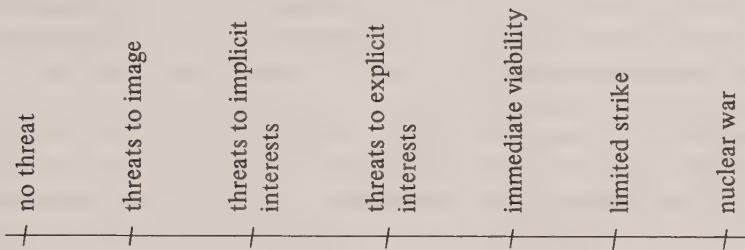
The perceived threat emanating from events occurring in the international system may be defined in terms of its disruption to the interests of the state, that is to its policy goals, either stated or implied. Towards defining a high threat situation Hermann (1974) notes:

... high threat is defined as a potential hindrance or obstruction to some object or state of affairs that decision making units are motivated to achieve. For threat to occur, the decision makers must recognize that achievement of their goals or objectives can be impeded or entirely obstructed.

While his definition explicitly defines *high* threat, we may extend it to cover a more inclusive continuum by recognizing that goals are to a degree structured in priority, and that the salience of each goal, or set of goals, will vary. Hence the perceived threat from an event is, at least in part a function of the salience of the "goal" or "object" it disrupts. The lower the priority of the national interests involved in the situation the lower the perceived threat, and vice versa.¹

Unfortunately, nations cannot, or do not for a number of reasons list their goal priorities in such a convenient fashion as to allow us to establish immediately the priority of particular goal(s) disrupted by the events of concern. Moreover, the contextual nature of the event may be such that "quick and easy" identification may not be always possible. Nevertheless, hierarchies of threat intensities in terms of their impact on goal priorities may be identified to approximate the threat perceived in a given situation. The following seven-point scale is intro-

duced to identify some of the characteristics that describe the threat perceived at various levels of intensity based on the salience of the interests the crisis situation most closely effects.



No Threat

The lowest limit and hence a boundary of the scale, of the threat hierarchy are those events or situations in which no US interests are perceived as threatened, and any disruptions that may be apparent may be attributed to goal objectives of other actors besides the US. These events may be viewed as routine and are filtered through the various agencies' crisis warning facilities and evaluated for their information value. Because the class of events in this group marks a limit to the range of the threat scale, they have no real importance in the model, other than for the information value they hold in forming the various components (decision makers, desk officers, etc.) views of the content of the outer environment.

An example of events in this category might be the enactment of a cultural exchange agreement between two nations viewed as friendly and having no impact on US economic goals that might have negative results or connotations. In general, the acts would be of such a nature that no strategic, economic, or political (diplomatic) goals are viewed as affected.

Threats to Image

The second hierarchy of the threat continuum contains those events that are perceived as having no particular strategic importance in a military sense but in a very limited fashion may threaten some political or economic goals. In generic terms we may view this group as threats to the national image. While no actual military implications are present, and while the salience of the political and

economic importance is reduced, some threat may be placed on the perceived roles of the US held by the leadership. Such roles or images may take the form of benevolent protector, moral leader, great power, and so forth. The threat raised from potential image disruptions is perhaps analogous to wounds to one's pride or to the potential conditions of "saving face" in light of an embarrassing, widely adverse event. However, to the extent that interactions are guided by various self-image perceptions, the role of threat at this level may be of importance in the crisis management process.

Some examples of events that elicit threat perceptions at the image level may be severe natural catastrophes which occur outside US boundaries, or natural or economic catastrophes within territorial boundaries, such as crop losses, black-outs, limited flooding, etc. They may also represent political acts, either directed at the US or others, which are void of strategic importance, but which again disrupt the images of the nation that the leadership holds. Diplomatic protests concerning air space violations by routine commercial traffic carriers, or the peaceful election of a regime less than friendly to the US in a country with which we have limited interaction and little interest in, explicit or otherwise, may be viewed as image threats.

Threats to Implicit Interests

The third point on the hierarchy identifies threats from those actions and events that disrupt our tacit interests as perceived by the leadership. In this category, while no demonstrative or overt evidence of national interest has been expressed or noted, the overall strategic posture of the US suggests some level of implied interest. Therefore, threats approaching this point will be characterized as of some minimal strategic importance along with carrying some degree of economic or political importance, in either case, largely dependent on the contextual setting of the crisis situation. We would expect the economic or political importance of the threat to be somewhat greater than the previous level (threat to image) suggested, simply because the threat at this level does attach some strategic concern. Therefore, the key identification factors are (a) the minimal strategic concerns of the government, and (b) the implicit nature of the interest involved or threatened. For instance, the conclusion of a trade agreement or technical aid arrangement between the People's Republic of China (PRC) and Liberia could be viewed as a threat to US regional interests in Africa and at the same time be characterized as implicit. In this case, threat exists because of the political and strategic interests the US has in both the regional politics of Western Africa, and in the PRC's overall role in world politics (or at least in certain phases of that role). Thus, while a lack of stated or otherwise evidenced

interest is present concerning PRC/Liberian relations, a degree of strategic importance may be attached to Chinese attempts to gain inroads with a friendly, but not overly supportive nation, and to establish relations with a notable, but not strategically critical area.

Of course, contextual implications in any such situation may require functional judgments. Salient aspects of an event fitting the definition may be of much greater or lesser importance in terms of threat perception than the category is intended to indicate. Also, some consideration must be given to the dynamic nature of national priorities. Perhaps some recognized but nonetheless "obsolete" interests, such as certain SEATO commitments may technically be identified either historically or for diplomatic reasons as explicit interest, but for practical purposes be considered as equal to or synonymous with implicit interests.

Threats to Explicit Interests

The next level of threat perception identifies those threats that are viewed as disruptive to explicit US interest, but fall short of the areas of concern for the immediate viability of the US security system (which will be dealt with shortly). In these cases of threat perception, specific occurrences in the world are viewed as having considerable strategic importance and/or great diplomatic and economic importance, but fall short of affecting the most immediate priorities in the nation's goal structure. That is, while the negative effects of the action or event are perceived as of some importance, the expected effect (impact) may be viewed as somewhat "long run." (This is not meant to imply that the situation automatically attaches a long decision time; that of course remains independent. Decision time is not necessarily equal to the period between the act and its impact, and in this area of threat perception is most likely not to.) Thus, for example, should Malaysia effectively close the Straits of Malacca to all vessels, warship and merchant, the impact, while not directly threatening to our immediate and more integral interests would smack at our explicit and overall strategically important goal of maintaining open sea lanes. An OPEC oil embargo at a time when there exists a relatively high reserve pool may also fit this category. While there is no immediate threat in terms of either economic impact and our strategic posture, a concern for long-range goals and planning in both areas could cause considerable threat perception. Also in this category are those threats, military and otherwise that emanate from actions which effect traditional and/or stated commitments (treaties) but which may be viewed as relatively remote in terms of their strategic proximity. Thus, if as in a previous example, the PRC concluded or attempted to conclude an extensive technical assistance

agreement with, say, Guatemala, the threat would be viewed in terms of our explicit not implicit interest in avoiding hegemony in the hemisphere, at least by others. Yet, because the strategic importance of the impact of such an event is somewhat reduced, it is unlikely that the threat will elicit a strong feeling of immediacy among the leadership. It is true of course that all threats of greater intensity than those arising from implicit interests will have a stated or explicit interest origin. However, threats at this level will not hold the strong and immediate strategic concerns notable at the higher levels.

Immediate Viability

Threats appropriate to this level, as opposed to the previous, are in part characterized by their "short term" nature, that is, their immediacy in terms of impact, and in part their relatively high intensities. Because of this, these threats are perceived to be of great strategic importance. Therefore, an action or set of actions that is (are) perceived as reducing the US's defense posture below an acceptable level by the nature of the action or actions alone is relevant to this level of threat. In general threat to our immediate viability is attributed to a belief that a set of actions and events has transpired that jeopardizes the ability to maintain national security although no direct violation of the geographical integrity has actually occurred or appears imminent. Thus, in most cases, we might expect the military dimension to have greater salience than either the political or economic, although actions relevant to the latter two could cause threat perceptions at this level. Indeed, as interdependences grow in a world of scarce resources, we might expect the latter constitute a greater portion of these types of threats. On the military or direct security side the Cuban missile crisis might serve as an example of threat perceptions at this level, while a complete oil embargo in the face of low reserves might constitute an example of economic or political events inducing threat perceptions at this level. War or severe hostile actions that threatens a viable and perhaps necessary alliance structure (NATO, for example) that is perceived as an integral part of our defense structure could also be classed in this region of the continuum. Such an event disrupts salient and immediate security goals because of both its destabilizing force, and to a lesser extent because of the perceived historic and traditional value of such alliances (European/North Atlantic).

Threats to Physical Integrity

The last two levels identified may be grouped together because in a large sense they represent varying degrees of a single class of events, those that

directly and intensely threaten the physical integrity of the nation. They include the threat of invasion in the conventional sense and strategic nuclear attack. In reality, of course, our main concern lies with the nuclear attack threats rather than with the advent of a conventional invasion since the latter, by itself at least, seems a rather remote possibility. The continuum is split in this way to recognize the concept that not all targeting strategies even those of nuclear warfare are aimed at destruction of the state, but rather that any number of strategies could be employed for a "lesser" goal.

For instance a limited strike could be utilized to reduce perceived capabilities. It might have as a strategic purpose the modification of the US's goal structure or specific elements of it. Such strategic concepts as "maximum acceptable losses," "reduced second strike capability" and "logistic impairment" all denote strategic interests within the state's integral boundaries without implying destruction of the state. On the other hand, and at the highest level of threat, the perceived (and actual) purpose of a nuclear attack could be the destruction of the state including both civil and military authority, the means of economic production and the greater segment of the population.

We should also note that threats to the structural integrity and especially threats to the survival of the state do not necessarily imply an attack from an external force and indeed may include threats to the state, as a governing institution, that emanate from internal situations. Open and intense rebellion, coups or insurgencies are such classes of events. Thus, threats to the government's ability to maintain and assert authority are also included in this segment of the continuum, as with any other case, of course, specific contextual knowledge is necessary to evaluate the actual perceived intensity of an internal threat and thus its relative position on the threat scale.

C. Decision Time

Our task in describing the decision time variable is in some respects easier than the threat variable, in that in all cases we are simply dealing with the standard units of seconds, minutes, hours, etc. Thus generic identification is somewhat automatic. What remains is to define the concept in terms of the crisis management process and introduce a method to actually scale the continuum.

Decision time in terms of the crisis management model is defined as the relative amount of time available for choosing alternative behavior. In terms of the functional crisis management process, it is the time span between the "initial crisis assessment," in which the various monitoring components in some degree of concern give notification of a significant deviation from the normal or routine flow of world event, to the selection and execution of a decided response

(including non-response). In short, it is the period from when the crisis event or events is recognized, until an executive order is issued to direct a planned (to some degree) response.

Because of the perceptual nature of the variable, it is safe to assume that the selection and execution of the response to the crisis situation will not be made until it is believed necessary. So long as the decision makers believe that time exists to continue gathering information and considering and reconsidering alternative behavior in response they will do so, much like a family might consider and debate alternate vacation spots up until the point is reached where it is believed reservations at a resort must be made.

For our purpose in defining the decision time in a given situation, there is also a need to recognize that decision time will not only vary between crisis situations, but also between the government agencies most closely involved in the crisis management process, the Central Intelligence Agency, the Defense Intelligence Agency, and Intelligence and Research Agency. By and large, these latter differences are due to somewhat different particular interests and different capability assessments held by each of the component agencies. In some cases what the CIA, for instance, views as a disruption or perhaps potential disruption to the flow of international events is not what either of the other agencies views as a disruption, or at least differing estimates of the magnitude may be observed. In short because of different self-interests, purposes and perceptual orientation, each of the involved components will approach the monitoring process with a separate attitude which may result in some differences in the perceived decision time for a given situation. While such a separation need not affect the decision time continuum per se, the condition must be recognized to accomplish total inclusiveness and, of course, discerning the individual perceptions is a major research issue in future work. The better we can account for the phenomena at this stage, the easier the task in actual operationalization.

Therefore, the more accepted or traditional treatment of the time variable as beginning with the actual crisis alert memo, and as an action in concert by the various component watch officers is somewhat inadequate for our purposes. It does not allow us to identify and measure the particular salience of events, in terms of this decision time factor, in the eye of the several agencies charged with monitoring operations. Rather decision time should be treated for the most part as unique in each event to separate agencies based on varying sensitivity to specific events in the world. This does not necessarily imply that each of the three monitoring stations is in competition with the others to be the first to "discover" a crisis situation, nor does it imply that vastly different outlooks on world events are held by each agency. It is simply an attempt to recognize and relate somewhat subtle differences that exist between the interests and priorities of the various crisis management components and their effects on the perception

of the decision time element. For example, we might expect an initial crisis assessment for, say, a coup in a Latin American country to take place within the CIA monitoring process before such perception is made in DIA or INR, because of the former's greater sensitivity to small scale military troop movements, officer assignments, staff meetings, propaganda broadcasts and the like, which cause concern at the CIA desk, while the latter agencies' desk will simply filter such reports. At the same time INR may be more sensitive to some forms of diplomatic exchanges which to their perception indicate a crisis afoot in the system, and the military more closely aligned to weapons tests, troop maneuver, naval movements and the like. In all cases an awareness to the actions is likely in all three agencies, while interpretation in terms of importance may vary, triggering an earlier crisis assessment.

D. Uncertainty

In previous crisis studies the general trend in defining the crisis situation has involved the employment of a "surprise" element (see Hermann, 1969, for example). However, as Phillips (1977b) has pointed out, surprise is not a necessary trait of a crisis situation, that is, it is not always present. Indeed as computers and other sophisticated communication and monitoring systems are introduced into the intelligence monitoring and gathering process, we might expect the occurrence of surprise to be less and less of a feature of the crisis profile as time goes by. Moreover, in terms of variability its usefulness to the model is limited because of its binary nature; the system is either surprised or it isn't.

The use of uncertainty on the other hand provides a wide range of variability and consistently relates to the decision process throughout the crisis period, rather than only to the initial phase (see Chapter VII). Conceptually, uncertainty is a two-fold phenomena; in one circumstance it measures the perceptual reliability associated with the information received concerning the events in the environment; and in the second, it measures the anxiety accompanying the decision process in selecting and implementing the reaction sequence. In the first consideration such factors as completeness of reporting, accuracy of intelligence, and reliability of sources come into play. Knowledge based on reports and assessments from intelligent networks with previously poor "track records" or reports based on remote sources, for instance, may be perceived as highly uncertain, while highly regarded and closely controlled sources may strive to reduce uncertainty. In this connection we might suggest that the greater control the organization exercises over the sources of intelligence the less uncertainty the process will attach to the assessment. For example, note the US's reluctance to

rely on Cuban underground reports during the missile crisis due to attached reliability problems connected with an inability to influence the underground operations, but at the same time to place great confidence on the U-2 and other covert sources under direct control. However, great uncertainty may of course prevail despite any ability to control the sources since obstacles to direct and comprehensive examination of the activities exist. Only in the most uncommon circumstances will the crisis management process perceive "zero" uncertainty concerning their knowledge of the situation.

In its second role, uncertainty is an inverse measurement of decision makers' perceived ability to influence the environment. In the crisis management situation this entails the probability that alternate actions in response will result in the desired environmental augmentation, i.e. satisfactorily resolve the crisis issue. Again to use the Cuban missile crisis, it is the uncertainty held that the blockade would result in the missile removal or that the action would result in some other alternate scenario, equally satisfactory to US objectives. As with information type uncertainty policy or response related uncertainty reaches "zero" only in the most imaginative or unusual situations.

In the operational system, two alternatives exist for dealing with uncertainty values. In one operation the subjective or contextual uncertainty of a crisis situation as a probability function could be ascertained and scaled for each dimension separately and then combined mathematically. Or, alternately, in recognizing the contextual subjectivity and variability of the component, a single value could be assigned to a given crisis situation which simply accounts for the two separate facets that form the variable. Because the subjectivity cannot be removed in either method, the latter seems preferable from a simplicity standpoint. In any case, the proposed scale for uncertainty is a probability range from zero to unity, with, of course, zero representing the lowest level of uncertainty and unity representing complete or the highest uncertainty.

Having defined our input dimensions, we can now define crises in terms of these dimensions, and we can specify what impact variations in these variables have upon crisis management. The problem facing DOD planners and decision makers is the necessity to make sense out of the multitude of signals they receive from their listening posts spread out around the world. Officers in indications monitoring are tasked with reading the daily flow of events and interpreting them in terms of situations that appear to threaten US interests or that portend the emergence of a crisis. Thus there appears to be a need to classify or type situations which might confront DOD personnel in terms of those characteristics which produce different requirements for crisis management.

One imaginative way to type crises has grown out of the decision making approach. Robinson (1962) suggested that the characteristics of the decision situation in a crisis form a typology. This typology includes the identification of

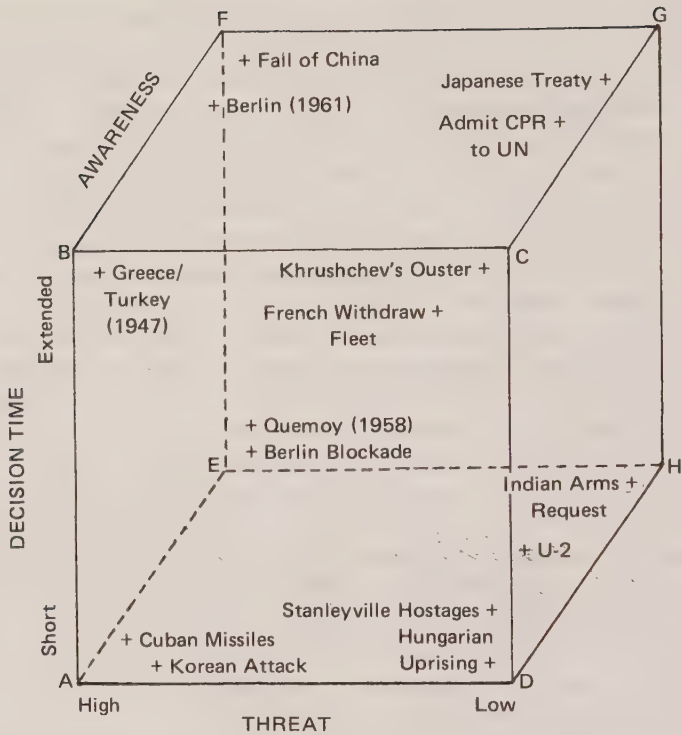
the origin of the event (external or internal to the political unit), the decision time available to the decision maker (short, intermediate, or long), and the importance of the values at stake to the participants (high or low). Hermann (1969) rearranged this typology to include three dimensions: surprise (the amount of prior awareness of the situation), the amount of decision time available (short or long), and the threat present to the decision maker (high or low). This typology was designed for the situational analysis of actions, with the behavior of the actor being a function of the situation he faces (Hermann, 1969, p. 409). As such, the main concern in delineating situation types is the investigation of that act, or event, which places the decision maker in a particular type of situation. That is, it is the decision maker's perception of this event in terms of the three dimensions of surprise, decision time, and threat that distinguishes one situation type from another. Hermann represents these three dimensions in a crisis cube (Figure 3.1). He argues that it is only situations in which there is a high threat, low decision time and surprise that can be termed crises.

From a policy analysis view point, however, we find that crisis situations are more dynamic than this and that crises can take on meaning in other regions of the space. The four high-threat situations (A, B, E, F) have crisis implications as does situation D. In situation D, however, watch officers are dealing with a situation that is both a surprise and the decision time is very short. The problem that analysts and watch officers must immediately face is whether there is a high threat to US interests (situation A) or not (situation D). Indeed this is a most taxing intelligence responsibility, as we shall see shortly.

Increasing the government's ability to handle crises through such communications technology as envisioned in the World-Wide Military Command and Control System (WWMCCS) is, of course, a way to increase its overall problem-solving capacity. The word crisis simply denotes a very important subclass of problems faced by any government. Thus, to design better ways of dealing with crises is to design better ways to solve a whole class of problems.

Policy analysts recognize crises as a subclass of problems to be solved that require nonroutine strategies. Howard Lentner (1972, pp. 120-121), in a survey of situation watch officers in the State Department, found that most officers agreed that a change in routine occurred during a crisis.

Even more impressive in this regard was the virtually unanimous response by the watch officers to the question, 'How does one know when a crisis is over?' That response was, 'a return to routine.' Without specification of precise divergences from routine in a crisis, the response can tell us only that the Operations Center watch officers clearly and almost unambiguously regard crisis as embodying unusual organizational behavior. It does not suggest that, in spite of denials of the utility of the concept of crisis, they do recognize that things go differently on occasion. One may draw the conclusion that there are periods when departure from routine is sufficiently great to be apparent to all participants. This does not close the question of whether every departure from routine should be called a crisis.



A situational cube representing the three dimensions of threat, decision time, and awareness, with illustrative situations from the perspective of American decision-makers. (Note: The representation of a three-dimensional space in a two-dimensional diagram makes it difficult to interpret the locations of the situations: their positions should not be considered exact in any case.)

- | | |
|-----------------------------------|---------------------------------------|
| A. Crisis Situation | E. Reflexive Situation |
| High Threat/Short Time/Suprise | High Threat/Short Time/Anticipated |
| B. Innovative Situation | F. Deliberative Situation |
| High Threat/Extended Time/Suprise | High Threat/Extended Time/Anticipated |
| C. Inertia Situation | G. Routinized Situation |
| Low Threat/Extended Time/Suprise | Low Threat/Extended Time/Anticipated |
| D. Circumstantial Situation | H. Administrative Situation |
| Low Threat/Short Time/Suprise | Low Threat/Short Time/Anticipated |

FIGURE 3.1
HERMANN'S SITUATIONAL TYPOLOGY

from Hermann (1969), page 415. (Reprinted with permission of Macmillan Publishing Co., Inc., copyright 1969 by The Free Press, a Division of Macmillan Publishing Co., Inc.)

Discontinuity such as suggested in the quote is determined by the observer; it is based on the instrumentation and methods of investigation. If one has the proper tools and the proper data resource, it is possible to define discontinuity in one's variables during crises. For example, one example of a structure that clearly experiences change in a crisis situation is the State Department's watch officer. In a normal period the State Department will route its cable traffic to a desk officer who initiates standard discontinuity in this operational procedure. During the crisis the cables are routed to a crisis situation room where special teams of analysts are brought together to deal with the messages. There are, of course, several bureaucratic shifts in behavior noticeable in crises. The operations staff (J-3) for the Joint Chiefs of Staff has a set of procedures which shift at the outset of a crisis. The set of instructions for completing this shift requires two very large 3-ring binders to hold them together. The magnitude of the message traffic shows a considerable jump from a noncrisis to crisis periods. Statistics on crises exercises suggest the jump is on the order of 300 times.

Thus, it is our contention that a crisis in international relations is equivalent to this shift in behavior. It is this discontinuity in behavior that operationally defines a crisis for policy makers. To capture this discontinuity one needs to identify variables which indeed show shifts in behavior at the outset of a crisis. Crisis behavior variables are those which can graphically be described as any of the following four relationships (Figure 3.2). There are two characteristics of these relationships that are important. First, all of the relationships show abrupt changes. There are no smooth transitions, no slowness in the change of behavior. Once the change begins, it is done. Second, a crisis can be described as a change in behavior in either direction. Those relationships showing a decrease in the level of behavior may be as important and as stressful as discontinuities in the positive direction. Still another point that might be made about the relationship concerns the abnormal levels of behavior in the system as expressed in the last two relationships. The second discontinuity seen in these relationships probably should not be considered crises; rather they should be considered transition phases because they are a return to normalcy. Several empirical studies bear out these assertions. McClelland and his associates (1965, 1968) find crises characterized by shifts in both the quantity and variety of actions exchanged between nations.

Lentner (1972) again argues that surprise is not a characteristic of most crises for bureaucrats. Indeed most analysts argue that it is rare that a crisis has not been foreseen. It is even rarer, however, that a crisis foreseen actually occurs. The argument here is not simply because the decision making system has an indication monitoring function that it can not be surprised. Rather, due to the indication monitoring function it is not *always* surprised. If one defines the crisis situation solely in terms of events with surprise, one eliminates a great deal of

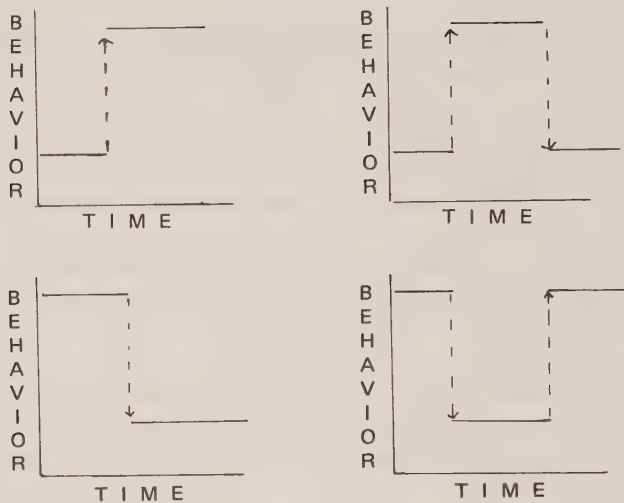


FIGURE 3.2

BEHAVIORAL SHIFTS DESCRIBING CRISIS

important events and situations that have the potential of being described as crises. Some analysis has shown that what appears to be crisis situations have occurred in times of low as well as high surprise (Phillips and Hainline, 1972).

Replacing the surprise variable with degree of uncertainty makes a good deal of mathematical sense as well. One replaces what could best be described as a binary variable — you are either surprised or you are not surprised; with a variable that allows for the measurement of reliability of the situation. That is, uncertainty acts as a measure of how much information is necessary or how reliable an action is in a particular situation. Uncertainty can be thought of as a function of both the input and the output of the system. In terms of input, uncertainty measures the degree of reliability of information as well as its truthfulness. Here the reference is to the indications monitoring initial crisis assessment and threat assessment functions. In terms of output uncertainty can measure how certain decision makers are that a particular action will limit the threat. Here the major functions in crisis decision making appear to be threat assessment and response selection.

The surprise characteristic of Hermann's situation deals only with the initial assessment of a situation, as time progresses the decision making structure can not be surprised. The uncertainty variables on the other hand covers the whole crisis period.

The model recognizes two dependent or "behavior" variables: 1) behaviors considered as alternatives to meet the crisis situation, and 2) behavior in terms of movement along the decision path towards the execution of a particular alternative, or option. In essence one is a "possible action variable" and the other is an "implementation variable," and as such maintain independence from each other although possibly certain pairwise, but non-related comparisons can be made between the two. As with the independent variables each of the dependent variables will be discussed individually. However, the distinction between the two should be clarified. In the first variable our interest is in what can or should be done in terms of possible US actions to meet a crisis situation: intelligence, economic, military or political behaviors that may be brought to bear to influence, favorably, the crisis situation. In the second dependent variable, our interest is in measuring the level of activity taken to implement the response.

E. Response Behavior (Y_1)

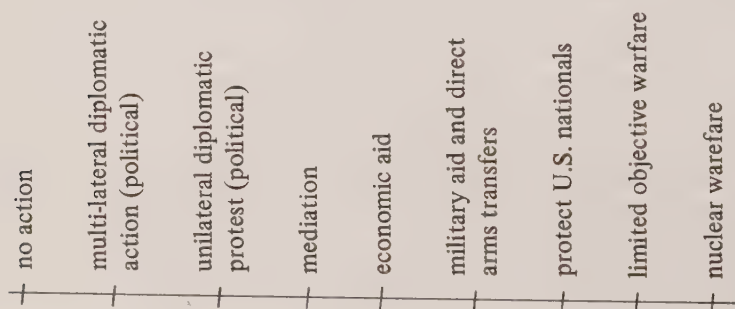
Although the view of decision makers as completely autonomous entities commanding a nearly infinite range of alternative in the pursuit of rational interest has almost completely vanished from the literature of crisis management, it is fairly obvious that in any crisis situation the three independent variables in concert with a nation's capacity to respond to a given situation, and perhaps its former crisis behavior, combine to present the decision maker with a finite and discernible range (or number) of alternative behaviors for response. Because the influences of capacity and past decisions change very slowly over time or remain more or less fixed, they may be treated here as constants in the long term memory, i.e. as parameters of the model that shape the decision maker's views of the world.

The behavior that results from influences of the three independent variables may be ordered on a continuum that may be interpreted in terms of the severity of the response action, both to the degree of US involvement and the intended impact or force of the action on the target actor. In this perspective the input into the decision process from each of the three crisis monitoring agencies and the course of action prescribed in the actual response will be perceived as sufficient to accomplish the desired outcome, but not significantly beyond that which is believed necessary for the specific accomplishment of US objectives. Thus, while we might expect some separation between the inputs of CIA, State, and Defense, as to the appropriate action responses or available alternatives, it might also be expected that the inputs from each will in fact cluster together to some degree based on the shared belief in the necessary and sufficient inten-

sity of the proposed alternatives. For example, it is unlikely that in the heat of the Cuban missile crisis the State Department would propose a mild diplomatic protest to the Soviets as a necessary and sufficient response to the situation, but at the same time it is unlikely that they would be supportive of a strong military action such as an invasion of Cuba, that might be posited by the Defense Department as necessary and sufficient to accomplish removal of the missiles. Neither the State Department's perspective of the "real world" nor their own particular interests dictated a supportive position of such a Defense Department proposal, while at the same time, their view of a sufficient response ranged beyond diplomatic means, leading to the support of a less drastic and in their eyes less dangerous military action than invasion (although some dissension has been noted). Thus while the participants may cluster on a military response in some form, separation also exists concerning the intensity.

We should also note a particular problem in relating a nation's role in a crisis situation, that is, the involvement is either direct or indirect. In short, even though the continuum of responses is classified along a single continuum based on intensity it should be kept in mind that the crisis situation may place the US in either a direct or third party role and thus there is a need to consider both roles in defining the range of possible behaviors. However, as will be seen below, intensity above a specified level implies direct involvement while at lower levels it may imply either a direct or third party involvement. This is because as the range of intensity reaches the higher levels of economic and military response, alternative direct involvement becomes necessary. The US is no longer a third party, for instance, once troops are committed in response. However, direct involvement may also be implied at the lower levels of diplomatic (political) and economic responses as well.

The following nine-point continuum of action response has been developed to describe the first dependent variable. A brief summary of each identified level follows in the discussion.



No action

The lower boundary level is defined to account for those responses to a crisis situation that may be characterized as "non-behaviors." These are situations where perceived goals or interests may be accomplished by doing "nothing" or where the influences of time and uncertainty drastically reduce the number of alternatives. In terms of description, the behavior is completely obvious, simply no action is forthcoming, although a discontinuation of the monitoring and information gathering process is not implied. Inaction may be associated with situations where the US is directly involved or where it plays a third actor (non-dyadic) role.

Multi-lateral diplomatic action (political)

The types of behavior indicated at this level of action are for the greater part limited to behaviors channeled through or related to IGO's, regional associations, or formal alliances (such as NATO, SEATO). They represent such actions as resolutions and protests supported or introduced in the General Assembly (or any other appropriate form) in response to a particular crisis event or set of events and are characterized in a general tone that is absent of threat, or material involvement, expressing instead such sentiments as "disappointment," "appall," "outrageousness," etc. targeted at either all or specific antagonists (participants) to the crisis events. The action may reflect (1) direct US involvement (as in, say, protest over the nationalization of small, economically important US business interests), (2) indirect involvement, with support of a particular "side" (as in, say, voting against a resolution condemning some Israeli action), or (3) indirect involvement with no concern for the particular issue at hand (as in the introduction of a resolution condemning all antagonists to a conflict event-not involving the US). Although, as always contextual considerations remain important, the dominant characteristics are the multi-lateral (nonspecific) channels of the response, and the lack of substantially threatening or counter-threatening action.

Unilateral diplomatic protest (political)

This level bears close resemblance to multi-lateral diplomatic protest, except the action is specifically directed towards the involved actors through any number of formal diplomatic channels. The unilateral nature of the action is viewed as signifying a higher level of involvement (intensity), either directly or indirectly, on the part of the US than in the previous level. Some examples might be diplomatic protest over the closing of an international strait, a diplomatic note condemning hostile behavior by one or all parties to a conflict

situation or protests over nationalization of substantial US foreign holdings. As with multilateral actions of this nature the action will be marked by a lack of specific threat to the intended target or targets.

Mediation

Behavior at this level of response indicates a willingness on the part of the US to assume a substantial third party role in a crisis situation. Although the variety of format for mediation is considerable, its most prevalent forms suggest similarity to "good offices" types of diplomacy in historic examples, where the third party role in a crisis situation is by and large limited to activities of peaceful settlement through formal or semiformal procedures of negotiation. Again the action is free of threats or offers to the direct antagonist, although some inducement, coercive or otherwise may be employed to initiate and sustain the mediation process.

Economic aid

This level of behavior generally implies a third party role for the US, although the economic aid contemplated or actually transferred may be to a nation that the US shares a direct interest role within the crisis situation. Because the aid is directly aimed at specific participants and most likely carries significant importance to the recipients, this level of behavior can (and often will) represent a desire for a specific outcome on the part of the US decision makers. At the same time it reflects an unwillingness, for whatever reason (most likely political) to play a more vigorous role in the crisis situation. Of course, economic aid may take a number of forms, such as capital transfers, foreign aid, food stuffs, medical supplies, etc., but will not for these purposes reflect any military material or manpower. Technology transfers at this level will also reflect a nonmilitary capacity although it is possible that military personnel may be required in a manning capacity. For example, US medical aid in foreign natural disasters, such as the Nicaraguan earthquake. It is often accomplished by US Army surgical teams and mobile field hospitals. In short, most forms of behavior short of direct military and political intimidation and greater than some form of *purely* verbal performance fall on or near this level of behavior (purely verbal in the sense that the threat or promise of a more manifest behavior is about).

Military aid and direct arms transfers

As the labeling expresses, this level of behavior is fairly straightforward,

designed to identify those levels of behaviors where the US appears willing to play an active yet somewhat indirect role in influencing a particular crisis situation. Nonetheless, the military commitment at this level is void of manpower requirements, except where technical advisement is necessary, as in the case of many sophisticated weapon systems, tanks, aircraft, SAM's, etc. Those providing the assistance are expected to maintain a non-combatant role. Military material is defined here as any systems and equipment or the means of production thereof that are specifically intended for direct support in armed conflict. Interest in this instance means a specific intent of design and intent of usage, by both the supplier and the recipient (consumer). Thus, tractors or other farm implements, for example, or the capital goods (plant and equipment) that might be supplied for their production, would not qualify as arms transfers even though they might have a military capacity if so desired.

Protection of US Nationals

At this level the intent is to identify a set of behaviors that involve an extremely limited set of objectives, but is thought to be important for basically three related reasons. First, the objective of protecting US nationals seems to be an important and consistent concern of policymakers in foreign crisis perception. Particularly in situations of high threat, the priority placed on insuring the safety and well being of US citizens near or at the geographic center of the crisis or crisis situation is of major importance. Secondly, it is felt that close attention to such concerns in future research may provide clues to more covert motives for such behaviors, which from a policy standpoint might be more salient. For instance, the protection of US citizens in the Santo Domingo intervention of 1963 may have been secondary to US concerns over another Marxist state in Central America. Thirdly, and most important to our immediate objectives in this paper, historically such actions mark the lowest level of direct US military manpower applications, outside of advisory roles. By lowest level we mean both in terms of actual troop commitment (strength) and the saliences of the objectives. Thus, for purposes of definition, actions at or near this level of behavior are marked by US troop commitments, for a singular objective, and by the immediate withdrawal of forces upon completion of the task. In most cases the planning phase of the operation will hold concerns for withdrawal of troops (and civilians) as well as concerns for the other precedent phases of the operation.

Limited objective warfare

Behaviors at this level are characterized as direct military involvement, most likely with conventional forces with specific and definitive goals and

objectives clearly in evidence. In this case, as opposed to the previous level, however, the goals relate to more than simply protecting US citizens or property. In short, it represents a behavior to effect or attempt to effect a specific outcome in a crisis, but is limited in objectives to those purposes. Troop occupation beyond that necessary for goal accomplishment or for such purposes as annexation, or destruction of the state (*vis-à-vis* the regime) is contrary to the purposes of this level of behavior. Thus should, for example, the US commit troops to either disengage antagonists or aid one side or the other in a Middle-East conflict, the action might be characteristic of this level of behavior, so long as either the objects stayed within the areas of disengagement, or aid to one side was primarily a defensive action. The Guatemala crisis of 1954, the Korean War (at least at the early stages), and perhaps Britain and France in Suez, 1957, might be an example of behavior at or near this level.

Nuclear warfare This, the highest level of behavior on the continuum, is, of course, characterized by the rather loud noise, large mushroom shaped cloud, and the complete absence of whatever was there before. In a more serious vein, the use of nuclear weapons as a behavior response is represented here as the extreme of the continuum, and includes all types of warheads and delivering systems. Small tactical systems and warheads are included even though conventional systems may be more destructive, or the idea that the use of any nuclear system regardless of strength will be perceived world-wide as an extreme act and that the likelihood of reactive response from other nuclear powers is very high.

F. Implementation Behavior (Y_2)

In the case of the second dependent variable the emphasis shifts from the possible actions the US may take in a crisis situation (i.e. response behaviors) to the behaviors that relate to carry out a response or set of response or reactions (i.e. implementation behavior). The theoretical drive of the variable is accounted for by the observation that in a crisis situation gears are in motion, so to speak, to carry out a set of procedures, many of which are specifically detailed in Standard Operating Procedures (SOP), which may (or may not) ultimately result in response execution. The extent to which the implementation process is carried forward is a function of the crisis perception and hence related to threat, decision time and uncertainty, and of course changes that occur in those independent variables. Because the variable's highest value is the execution of a particular response (the first dependent variable), its inclusive values may be viewed in terms of planning actions, with each identified value representing a

significant step towards a behavioral response, and as following a path delineated by SOP's. Because of the nature of the US crisis management process, each level or step will also contain some identifiable mix of political and military involvement as planning carries forward.

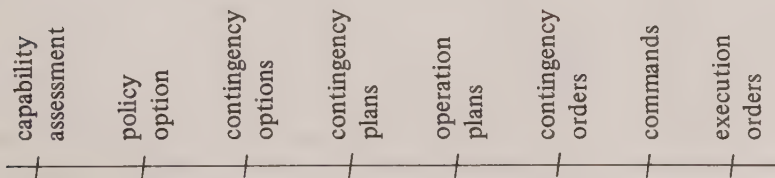
Thomas G. Belden in his article, "Indicators, Warning and Crisis Operatives" (1977), discusses a number of steps that a country considering a major military action may undertake leading to the actual attack. Figure 2.3 presents his staircase for decisions. Although his interest lie more specifically with improving our monitoring and warning processes, we believe the same or at least a similar planning continuum may be directly applied to the nations in the above discussion. A nation will plan its response to a perceived crisis much the same as it would plan any other military operation, even though the crisis response may not include direct US military participation. This is, of course, logically correct, although specific attention should be paid to the idea that since the continuum is distinct its application is totally contained within or limited to the crisis situation and thus it is directly influenced only by the independent variables previously identified.

In outlining an eight step stairway to execution Belden (1977 pp. 184-185) observes:

First the national decision maker must be aware once he feels threatened by a nation, he must determine his policy options (what he might do if . . .). He must then examine contingency options and plans, and, if the threat continues, move up the decision stairway with operational plans, orders, commands and finally the command of execution.

At any time Belden notes the ascendancy up the staircase may be stopped or reversed by a perception of behavior on the part of the antagonist that in effect signals a "backing off," interpretable as a reduction in threat. Likewise, the nation's movement and position on the stairway may also be easily seen as affected by changes in the time and uncertainty factors associated with the situation, having both positive and negative influences that cause movements up or down the stairway or influence no movement at all.

Drawing the assumption that crisis response actions are simply specific cases of political or military actions in general (and more closely attuned to the latter) then the decision staircase as a continuum may be represented as the following:



Since each step represents a specific geometric distance from the actual execution stage, they may be valued as probabilities of the execution occurring; the higher the movement on the scale the higher the probability of execution. Or stated in slightly different terms the farther down the planning path the process moves, the greater its chances of actually completing the operation become. However, we should note that the "go no-go" threshold is only at execution. No point of the continuum marks a point of irreversibility.

Let us now briefly discuss the points or stages identified keeping in mind once again the tentative nature of the variable at this stage.

The first planning step, capability assessment, is nearly self-explanatory. Once a crisis situation is perceived, an immediate appraisal of our capabilities, specific to the situation will be made. At the outbreak of hostilities between Israel and Egypt, for example, an immediate determination of the position and status of the Sixth fleet and its component forces, carrier divisions, cruiser-destroyer flotillas, subforces, etc. will be made, along with CINCEUR ground and air power status and position reports. These updated force status reports, along with any other pertinent political and military information will constitute the capability assessment for that situation, at least in part.

The second step on the decision path represents an assessment of sorts, or a review of the policy options available that are pertinent to the perceived situation. In many ways this step is analogous to an attitude appraisal. In some cases, of course, previous commitments and policy statements will limit the field of options, while in other situations a lack of commitment may provide a much wider range. However, contextual conditions could also result in a rapid change and even a reversal in previous policy positions. Thus, again using a hypothetical Middle-East scenario, a policy option might include support for either side, a call for immediate succession of hostilities, a desire to avoid any form of intervention or perhaps a policy to thwart other party involvement such as the U.S.S.R. Because of a relatively highly developed policy for the area, we might expect a somewhat restricted range of options for most crisis situations in the region. As a final note, we should point out that this stage of the decision process may often be utilized by decision makers as a point for signalling a new policy orientation towards the matters at issue.

The third level, contingency options, represents a first order appraisal of possible US actions in alternative scenarios relevant to the crisis situation but specifically lacks any decisions on actual actions to be taken. Thus in viewing a situation, planners might say for instance if X does, or continues to do, action "a" we may respond with actions "x," "y," or "z." Obviously, the nature of the perceived action and the contingency responses developed may take numerous forms but in all cases the objective remains the same, to develop suitable (viable) alternative purposes to a dynamic crisis situation. In this light, contingency

options may be based on alternate US responses as well as events emanating from the environment. Using the previous example, the US planners may perceive such contingency option available as direct military intervention to aid either side, stop the hostilities or to protest and evacuate US nationals, or they may perceive such options as diplomatic and/or economic pressure applied to achieve a given outcome, or some combination, perhaps based on the probability of failure for one or the other in sequential operations.

The fourth step, contingency planning, represents the development of actual planned responses based on the perceived contingent alternatives developed at the previous level. In a sense it is a "first commitment" or decision to follow specific options based on the development of events related to the crisis situation. Thus, the emphasis shifts from a "we can" frame of mind to a "we will" attitude at this level, although no specific course of action is implied, except of course if the range of options is limited to one alternative, as might be the case in a nuclear attack. Thus in the Middle-East situation, contingency plans may be developed to evacuate US citizens near the battle lines, resupply Israeli Air Force units, attempt a mediation role to end the conflict or cut off aid to all or specific parties to the crisis, or to respond in some combination. As with "contingency options" the "if . . . then . . ." consideration play a major role, although planning remains the dominant feature of this step.

The next step, "operation plans," represents a shift from crisis strategies to crisis tactics, that is from what will be done given possible or perceived alternative developments to how it will be done. Planning at this stage will include the various level field commanders and diplomatic officers most directly involved, to settle questions and formulate working plans, so to speak, on the contingency plans developed at the previous level. Thus, if evacuation of US citizens remains among the contingency plans, operation plans specific to that objective might include embarking a marine battalion on a Sixth fleet carrier division at Corfu (Athens), planning the division's deployment to the Eastern Mediterranean and a rendezvous with necessary naval gunfire support, etc.

At the next stage the operation plans developed are converted into contingency orders, representing the highest level of readiness to enact or carry out a response action or actions to a crisis. In symbolic terms this stage represents a willingness on the part of the US to carry out contingency plans to effect or attempt to effect a specific outcome. In terms of actual enactment, it is the issuance of a set of orders to the appropriate military or diplomatic units to carry out specific actions upon command or to proceed with preparations enabling command execution. For example, our UN ambassador might be told to arrange for an emergency session of the Security Council or to obtain floor time in the General Assembly, US ambassadors to relevant countries might be told to prepare to deliver a diplomatic note or fleet units might be directed to

specific waters in preparation for possible actions. In our scenario contingency orders for personnel evacuation might include an order (in contrast to a plan) to sail from Corfu to a station, say, off the coast of Israel or Lebanon to await an order to proceed with the evacuation. In all cases no direct actions are implied other than those that may be viewed as preparatory.

The final level before the actual response action is the executive order stage in which orders are given at the national command level to enact specific contingency orders. While the executive order does not constitute the action itself, it is evident that the probability of an action consistent with the order occurring is quite high. Thus in our scenario should personnel evacuation be among the selected actions in crisis response, an executive order would be issued at this level for its enactment, most likely within a specific time frame (e.g. "commence evacuation of US personnel at 0600 hours").

Although the decision path as presented here has most strongly emphasized the military aspects of the process, it is important to bear in mind that an equal fit of the sequence may be given to political responses as well. Also, it is re-emphasized that though the path is sequential, automatism is not implied. The accomplishment of one level does not necessarily imply upward movement to the next.

Notes

1. These assumptions parallel many of the assumptions made by rational theorists. See Frohlich and Oppenheimer (1978) or Riker and Ordershook (1973).

Chapter IV

Crisis Perception Model

The objectives of this chapter are twofold. First, to sketch out the coding models, and secondly, to report on the procedures employed in developing agency images for crisis management. In simple language we are attempting to replicate the pattern recognition processes of three of the agencies charged with monitoring and reporting on the status of events around the world: the Central Intelligence Agency, Defense Department and State Department. In operation this translates into a computer mapping operation in which the perceptual impact of events on crisis salient variables are scored in probabilistic values for various interpretations and into relative values for the models three dependent variables, threat, uncertainty and decision time. Thus the user may code a crisis, either real or hypothetical to gain information concerning: 1) the likelihood of each agency forming specific images of the nature of the situation (i.e. the pattern recognition processes) or, 2) concerning the perception of threat, uncertainty and reaction time available to deal with the imagined situation.

One of the basic concerns of the effort is the process of pattern recognition within the agencies. In the context of the simulation, the formulation of meaningful images of what's going on "out there" as raw intelligence reports (cable traffic, wire service reports, contact reports, etc.) is reviewed at each of the three monitoring stations. Two points are germane to this pattern formation. First, "meaningful" implies an interpretation of the raw data in terms of a set of politically, economically or militarily relevant variables from the standpoint of US interests or policy goals. Thus, for instance a report of a coup is "meaningful" by the change it may imply for political relations between the US and the country where the action took place, or for that country's relations with any of the other Super Powers (at this stage in the simulation's development defined as the USSR and PRC). This project conceives raw information as being constantly reported in terms of *a change in relations*.

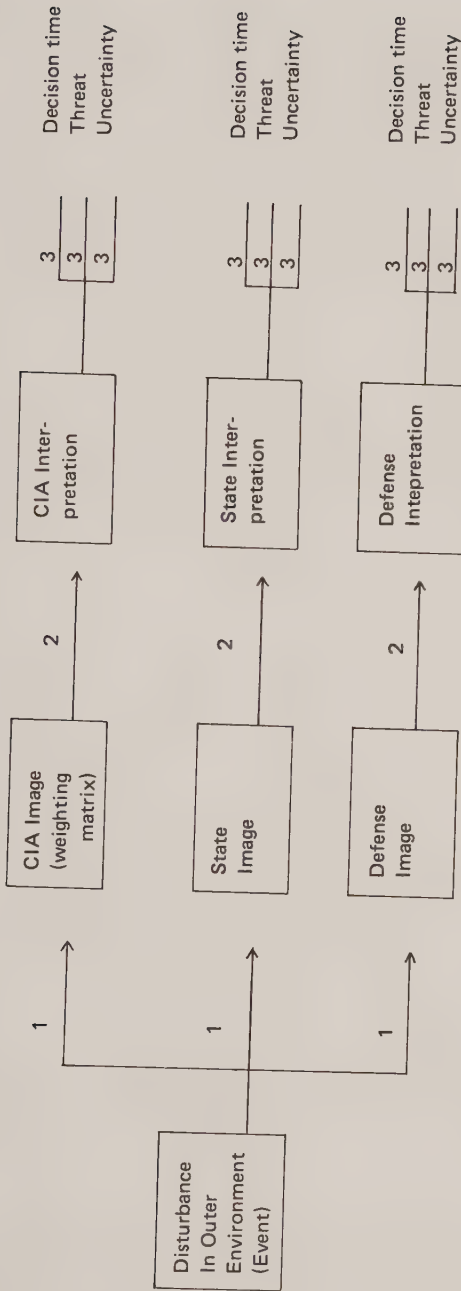
The second point in our development of a model, is that each of the agencies is likely to form somewhat separate (although possibly parallel) images. This is so, even though the raw intelligence received and initial processing mechanisms may be either very similar or identical.¹ Consistency in interpretation between the three agencies (the CIA, State Department and Defense Department) is not

perfect and indeed may vary considerably. In some instances agencies vary as to the interpretation which "fits" the pattern of events while in other instances the threat one agency estimates, may not be as serious as the other agencies' estimates. For whatever reason, it is clear that the agencies involved in crisis management vary as to their actual interpretation of events: each frequently reaches a different set of conclusions. In simplified form the process is represented in Figure 4.1.

As events in the environment are reported through cable traffic or other sources, the desk officers or monitoring station personnel form strategies of recognition that help them interpret the raw intelligence. It is these recognized patterns or interpretations that form the basis for an evaluation of the threat, uncertainty and reaction time associated with unfolding events. The basis of this evaluation process is the perceivers' previous image of the environment. All analysts have a "feel" for what is going on out there. The watch officer has some understanding or idea of the conditions and relations that exist in the pre-crisis period. This feel or image helps them to interpret reports. Also implicit in our argument is the position that perceptual evaluations are associated with separate and distinguishable agencies. The agency environment of the watch officer will greatly affect his evaluations — and interpretations formed. An analyst views an event as important (or not important) because of the change it brings (or doesn't bring) to variables that form the basis of his monitoring of the environment.

These evaluations of change (and their significance) are assessed or "totaled" so to speak by the analyst to produce an interpretation or a set of probable interpretations of "what it all means" or what it is likely to mean in the future. This stage basically represents the formation of a set of images of unequal probability that fit the dictates of the event stream. In the actual crisis warning system such scenarios are often couched in terms as "it is highly probable that . . ." or "it is less likely that . . ." In our analysis this process of interpretations dealt with analytically and scored with probability (0-1.0) over a set of previously entered interpretations for each agency.

Finally, these interpretations form the basis for evaluating the threat, uncertainty and reaction time associated with the unfolding situation. The model conceptualizes threat as the cumulative changes perceived as negative to the interest of the US (or an agency); uncertainty from the lack of clarity or meaning in an interpretation; and an assessment of reaction time from the relative speed with which the crisis relevant variables change. Thus, if an analyst perceives an event as influencing only minor change in a few relevant variables, the probability of uncovering a discernable pattern is weak, his perception of threat-low, and his feelings of uncertainty about the environment-high. If some times passes before another relevant event is reported, his feelings for the need to react quickly are likely to remain quite low. Conversely, if the events implicate rather drastic negative change for several or all of the US interest



1. Coding of International Environment
2. Transformation of Events into Interpretations.
3. Transformation of Events and Interpretations into Perceptions of Decision Time, Threat and Uncertainty.

FIGURE 4.1
THE PERCEPTION PROCESS IN THE FOREIGN POLICY BUREAUCRACY

variables, high threat is likely, and a pattern is more likely to be recognized, thus reducing uncertainty. If relevant events also flow rapidly in such a circumstance, reaction time will be perceived to drop as a need for countering action is increasingly felt. It should be noted however, that threat and uncertainty are independent. Thus, drastic changes resulting in pattern recognition need not imply a clear perception as to the amount of threat. Nor, for that matter does the simulation require extreme change in the relevant variables for a pattern to emerge. However, the model does posit that the greater the change the greater the probability of specific patterns recognition. This last point substantively means the greater the perceived change in the environment the more likely the event sequence will be recognized.

To simulate pattern recognition and to produce values for the three independent variables the model utilizes three basic components, a coding matrix for reporting changes among the crisis relevant variables; an interpretation matrix containing relevant recognition patterns; and a weighted interfacing matrix to assess the relative importance of variable changes towards influencing an agency interpretation. We shall now deal with these components in some detail.

A. Coding Matrix

As noted, this component of the simulation is designed to report or code changes that may or may not occur to a set of crisis relevant variables as a result of an event somewhere in the environment. Figure 2.6 is the coding sheet developed to construct the matrix currently in use in the model. As Phillips and Rimkunas (1978) report, its format is similar to the reporting forms currently used by military intelligence (J-2) analysts, except that the format has been expanded to include a greater number of political and economic variables. Its function is to capture the importance of an event or more likely a series of events in the outer environment. It assumes the mind set of agency analysts in evaluating incoming traffic, i.e., an event is important or relevant because . . . " (it betters the Soviets relation with X, it damages the status of pro-US groups, and so forth). Because changes are scaled and self anchoring, it evaluates changes hierarchically (and from one event to the next). For example, an event may greatly better Soviet relations with X by a movement from -1 to 4 while mildly decreasing the domestic stability with a movement from +1 to 0. In this case, the analysis may show a net Soviet gain in its political relations as a result of the event.

To utilize the coding sheet the analyst reviews and records the events stream in the pre-crisis period to form a set of initial values for each of the 32 variables on the list using whatever data set or method (empirical or subjective) he chooses. He then makes an event by event analysis of the crisis and post-crisis

periods assessing changes to the variables that occur with each report. He also records the data on which the event occurs. The product of this labor is a chronology and mapping of the crisis as recorded in the source (in our case The New York Times) onto the variables of the coding sheet. Of course, not all variables are likely to change with each event, and indeed some or several may not change at all during the crisis period.

An advantage of the coding sheet is its adaptability to a number of data sources. In developing the simulation we have utilized both events data (WEIS Tapes) and case studies for coding with equal ease and success. The sheet format is also easily transferred to the computer simulation since the 32 value character (+4 to -4) simply forms a line in the 32 X N (days or events) matrix that represents this component. Thus a coded crisis might look something like the coding in Figure 4.2. By simply matching the values of the first line to the coding sheet (Figure 2.6), one will obtain the variable's status or values on May 21 and likewise on May 24, 26 and so on. By beginning the coding period prior to the crisis the analyst is able to establish an indication of the relationships prior to the crisis. In this way, he is able to anchor the simulation output in the normal environmental setting rather than having to deal with arbitrary values. Changes in the variable values are then made or anchored on an event basis. Casual examination of the example will indicate how change is reported. If the reader counts in eight digits from the left for each line he should find the following values:

0 May 21
-1 May 24
-1 May 26
-3 June 8

Since column 8 corresponds with "PRC military relations with X" in Figure 2.6, we can see that this variable has shifted from an "0" on May 21 to a minus 3 by June 8, indicating a continued worsening of relations at each event except between the 2nd and 3rd, which had no effect on the variable. If we assume that

0, 1, -1, 1, 1, -2, 0, 0, -1, 2, 1, 0, 3, 2, 1, 1, 0, 2, 1, -3, -1, 0, 0, 0, 1, 1, 2, -1, -1, 1, 0, 0 May 21
0, 0, 1, 0, 0, 0, -1, -1, 0, 1, 3, 0, 1, 0, 0, 1, 2, 0, 1, -3, -2, 0, 0, 0, 0, 1, 2, 0, 0, 1, 0, 0 May 24
0, 1, 0, 0, 0, 1, -1, -1, 0, 3, 4, 0, -3, -2, 2, 0, 3, 1, 1, -2, -3, 0, 0, 1, 0, 1, 1, 0, 0, 0, 0, 0, 0 May 26
0, 2, 0, 0, 0, 0, -4, -3, -3, 0, 1, 4, 0, -4, -3, 1, 0, 2, 1, 0, -2, -3, 0, 0, 0, 0, 1, 1, 0, 0, 0, 0, 0 June 8

FIGURE 4.2
CRISIS CODES

May 21 in the example is an initial pre-crisis value, we may observe that the relationship prior to the crisis was not particularly strong (good) or weak (bad) rather perhaps simply cordial.

The code sheet is designed as a tool to replicate an analysts' evaluating process as he reviews the event stream. The selective function; that is the process for picking events for analysis is fulfilled by the coder reviewing the data in much the same fashion as the agency desk officer reviews cable traffic. The models' user must first decide which events are salient and then record "why" according to the variables on the coding sheet. This process represents quite clearly the actual process. A watch officer reads cable traffic as it arrives at his station. He must form impressions of what is actually happening and he reports on sequences of events that implies actions relevant to US interests. These reports are of the form represented in Figure 2.2. They are probabilistic and represent an analysts' best guess. These "estimates of warning" are translated routinely into threat, uncertainty, and decision time.

In operating the simulation the user may exercise considerable flexibility with the coding component. In its current form the model will accommodate up to 40 variables which the user himself may select in order to accommodate his specific research interests. The list developed here is meant to parallel evaluative techniques currently utilized in the intelligence community. Therefore, it should serve as a guide to further applications of the model.

B. Interpretation

As the desk and watch officers of the three agencies charged with crisis warning functions view the stream of cable traffic and other incoming information, various mental images of what is going on "out there" are formed. These interpretations are based on the relative significance that individuals in a monitoring capacity place on specific events or clusters of perceptually related events. In many respects it is like listening at a door and forming an idea of what's happening on the other side. While the model recognizes that a number of influences may interact in the formation of these images or interpretations, including the clarity of signals, "noise" levels and the like, experience remains a major factor in their formation. Experience is understood as the by-product of the training, indoctrination and work assignments the various officers have had within their respective organization. It also stems from the operational directives and SOP's found within each agency that are germane to its operations. Thus, the image process in large measure is a product of the specific and general interests and goals of the watch and desk officers' own organization.

At the same time, though these agency oriented interests are to some degree parallel and perhaps even controlled by the administration's overall goals, they

are still idiosyncratic to each agency. That is, each of the three monitoring agencies is tasked separate to the others in terms of its primary functions and therefore to a degree holds a specific set of interests relative to those tasks or purposes. Of course, it is obvious that some overlap will occur and drawing distinct lines of interest separation remains difficult, if not impossible. Diplomatic endeavors often require military consideration or involvements. Military planning and operations require diplomatic coordination and both hold strong interests in the intelligence information gathering process. Yet the particular interest, assets and objectives of each agency will lead to some perceptual difference in the state of the outer environment at any given time.

These perceptual differences are more likely a matter of degree of interpretation rather than of specific issue or item disagreement. When, for instance, an agency perceives threat in an area or event there is a strong likelihood that the other two agencies will also perceive the same threat. However, it is unlikely that all agencies will agree on the magnitude of threat. More importantly, the agencies will probably offer divergent interpretations of the nature of the event or issue. The research objective of the segment of the model is to develop a set of interpretations for each agency that substantively reflect the "kinds" of interpretations each agency is likely to develop or hold as its watch and desk officers review the stream of reported world events.

To accomplish this goal, a two-stage research effort was initially undertaken. In the first stage, numerous sources were reviewed and a set of statements by upper and middle level agency officials reflecting perceptions of threat, uncertainty and/or the time factor involved in various world situations (crisis or otherwise) were extracted. The second stage involved reviewing the extracted statements for specific statements of interpretation that have relevance to a crisis situation. As incorporated in the model, these statements represent *likely* interpretations each agency would give to a turn of events in the outer environment based upon agency experiences, goals and interests. Although the inclusion process is largely subjective, it is believed that the simulation gains substantive validity since the method followed relies directly upon perceptual statements of actual key individuals within the three organizations. While the interpretations utilized for each agency are obviously not exhaustive, their direct attribution to specific agency personnel with some recurrency renders the list indicative of the kinds of interpretation each agency is likely to draw.

Table 4.1 lists the derived set of interpretations used in the model to this stage. It is important to point out that as far as the simulation is concerned the method used to develop interpretations is of little consequence. The simulation program allows the user considerable flexibility concerning the number of interpretations used for each agency, currently allowing up to 147 interpretations per agency. Should an analyst decide that all or some of the current interpretations are inappropriate to his specific research interest, he may either

TABLE 4.1:
A LIST OF AGENCY INTERPRETATIONS

<i>CIA Interpretations</i>	<i>Defense Interpretations</i>	<i>State Interpretations</i>
1) opposition forces to regime hostile to US likely to die out	1) Y has moved troops into attack position vs X	1) territorial integrity of X violated
2) status quo in X is upset	2) developments in X make it possible for them to mobilize and attack US supported troops before US troops can respond	2) situation in X is likely to lead to conflict
3) there is evidence that X is slipping and a Communist take over is likely	3) a new strategic capability exists in X	3) situation in X is creating hostages
4) certain elements in X might be a threat in the future	4) there is a communist threat in X	4) X occupied Y (aggression)
5) hostile forces are trying to gain support of elements inside of X	5) US citizens are in danger	5) X occupied X to protect its rights
6) X is likely to become a battle ground between US and other major powers	6) hostile forces have capability and intent to interfere with US activities	6) X aggression vs Y
7) the Communists are becoming adventuresome in X	7) X is questioning our reserve to fight	7) the situation in X is deteriorating rapidly and effects our commitments
8) there is an opportunity here in X to build assets for later use	8) limited attack on US is likely	8) others might be drawn in the conflict in X
	9) US units are under attack	9) likelihood of war increased
	10) we have lost contact with US units	10) X and Y in conflict we committed to X
	11) forces friendly to US are being over run	11) X and Y in conflict we committed to X and Y
	12) capture/seizure of US property	

eliminate any he chooses and/or supply any of his own through the program's relatively simple change route.

As noted, the substantive interpretation currently used in the model were developed from a number of sources. The basic criteria borne in mind in the collective process was the decision to utilize sources containing either direct quotes of upper or middle echelon agency personnel or basically reliable paraphrases. To obtain this "closeness" a number of source types proved useful including: presidential biographies and autobiographies, the memoirs of key statesmen or agency personnel, direct congressional testimony, case studies (either agency or crisis related), and "insider" accounts into agency operations, goals and interest. By utilizing the attributable quotes and statements for the greater part of the data set, author bias and other reliability problems are reduced considerably, although, as with any data set some problems still remain. Appendix A lists those sources utilized to develop the existing quote set.

Reviewing the sources for data was carried out using an informal key word method. The researchers simply scanned the literature for perceptually relevant statements concerning threat, uncertainty and decision time, marking the passages for transcription with appropriate citation. Finally, at various points in the process the collected statements were reviewed to assure approximately equal treatment of each of the three agencies as far as the number and substantive content of statements was concerned.

The final or tentative product of this stage of the substantive research was some 55 pages of statements concerning general perceptions of the world environment, agency self-perception and roles, real and potential crisis situation concerns and perceptions, and perceptions of feasible US actions and responses to a variety of crisis and non-crisis situations. It is important to note that attention to non-crisis as well as crisis perceptions were given during the collection process, thus allowing for a wider scope of perceptual imagery. Indeed, at this stage the criterion for inclusion is purposely defined as "loosely" as possible. In short, the goal is simply to develop a low cost synopsis of individual human perceptions attributed to responsible personnel of each of the three agencies. How those individuals conceptualize various situations, the relative importance they place on "situations vis a vis other situations" and the importance of their respective organizations in dealing with a particular situation are among the types of perceptual imagery we are attempting to capture at this stage.

The next stage in the research was to "boil down" so to speak the raw perception statements into a set of logical statements we have referred to above as the "interpretations." At this stage the perception statements were carefully sorted into themes of interests applicable to one (or more) of the agencies. As noted, the list is not intended to be exhaustive, but rather to simply express the interest orientations of the three agencies. Previous research indicates that they are interpretations agencies have drawn and are likely to draw in the future.

Examination of the lists by agency reveals both parallels in interpretations and some skewness. Particular sets of perceptions based on agency interests may also be observed. For instance State interpretations seem to reflect a fairly consistent concern for traditional and somewhat legalist concepts including regional and world destabilizing influences, unsettling influences or alliance related matters and politically volatile issues requiring great diplomatic manipulation and consideration. CIA interpretations reflect less concern for regional balances, remaining largely concerned with a country's specific issues or interpretation. There is also evidence of a more long run interest in world events, with a sort of balance sheet approach to US interests as the CIA defines them. That is, they seem to anticipate events and or situations as either plus or minus to overall US interests in a sort of strategic (political) chess match. Finally, CIA seems to share a concern with State for monitoring the status quo, that is a positive orientation towards maintaining the political map. Defense interpretations reflect a general concern for the US strategic posture, tending to interpret events as directly affecting US interests and integrity. A large part of these concerns centers on the far flung dispersion of US military personnel, material interests and/or commitments, and concern for our ability or inability to protect these "assets." In another sense there is a greater concern for the materials versus the intrinsic that is found in CIA or State interpretations. For example, conflict is more likely viewed as threatening to US owned or controlled assets than as destabilizing to a region or potentially threatening to friendly leadership elite.

At the same time, there is a significant parallel between the interpretation of the various agencies such that all events of major magnitude would trigger some interpretative response in each agency. That is, it is unlikely for Defense to perceive threat without State and CIA also perceiving threat.

The reliability and validity problems associated with both quantitative and qualitative content analysis are well documented (Merritt, 1966). No single, absolutely satisfactory solution seems to exist. However, as far as this research is concerned several points are germane. First, individual perceptions and ideas are of secondary importance. In the analysis stage greater attention was paid to statements reflecting an individual's agency role and his performance in that role, rather than those statements of retrospect which are potentially loaded with personal bias. For example, an advisor's actual statements or conversations with the President in the heat of the Berlin crisis would receive far greater attention than would his memoirs written some time after the fact. Likewise, Congressional testimony of "belief" would take precedence over testimony of "opinion," although obviously the distinction may be nebulous and judgmental. Secondly, a wide sample of individuals was included for each agency which was representative of various organizational strata. In short, we relied on a variety of statements from individuals made within the boundaries of their professional capacities. Sources beyond these requirements were included only when

additional supporting documentation was found. Third, the requirements of rigor are more or less limited to the objectives of the researchers and indeed may rest solely on the logic of the interpretation statements, regardless of the source.

The third segment of the simulation is the weighting matrix through which the event indicators are linked to the perceptual interpretation. Its purpose is to map specific event variables (Figure 4.1) to the various agency interpretations of the crisis simulation. It does so probabilistically. In other words, it provides the format for deciding or determining what changes in the event coding schema are likely to cause what interpretations to be made at the crisis warning level. It indicates the impact of events on the perception of the agency watch officers. In forming interpretations or mental images two points should be obvious: 1) not all changes in the reporting variables are likely to influence a single interpretation and, 2) the variables used to determine an interpretation are likely to vary in importance among themselves. Therefore, the mapping mechanism must be able to discriminate between the importance of the variables in determining the interpretation.

To accomplish these requirements three matrices, one per agency, were created to map and weigh the events variable to the interpretation. Figures 4.3, 4.4, and 4.5 are examples used in the models development. The column represents the interpretation with each value representing the weighted importance of the corresponding event variable. The scale values utilized in this example range from 0 to 9, with 0 indicating no impact on the interpretation matrix at all, and 9 indicating the greatest importance in the interpretative formation. It should be noted that both the columns and the variable values are independent. Therefore, the columns need not sum to an equal value although, of course, the weight assignments are relative for each interpretation. Column 3 of the State Department mapping (Figure 4.3) reveals which variable changes are influential in determining the interpretation "Situation in 'X' is creating hostages." In this column it can be seen that the first twelve variables are irrelevant by the values of "0" in the column. Variable 20, "Status of US citizen in 'X' " has the greatest value, indicating its highest importance in the formation of the interpretation in this example, followed in importance by variables 13, 14 and 15, all indicative of the internal situation in 'X', and so on, down to the value of 1 for variable 22, "the Status of US Property in 'X'." The objective of the matrix then, is to duplicate the process of pattern recognition: "I see or think I see this and that event occurring," which means — is probably occurring. In another sense it is a duplication of the conversion of raw data into intelligence material, that is, processed information or a meaning summary of an event or events' importance. Of course, the value or importance of the event and the interpretation as far as threat is concerned can vary considerably.

Like the values reported on the event coding sheet, the values included in the weighting matrix may be supplied by the user and determined through any

STATE DEPARTMENT MAPPING		INTERPRETATION										
		Territory of X violated										
		Situation in X likely to lead to conflict										
		Situation in X creating hostages										
		X occupied Y (aggression)										
		X occupied Y (protect rights)										
		X aggression on Y										
		Situation in X deteriorating										
		Others may be drawn into conflict with X										
		Likelihood of war increased										
		X & Y conflict, US committed to X										
		X & Y conflict, committed to both										
INDICATOR		1	2	3	4	5	6	7	8	9	10	11
1. USR Pol Rel with X		0	1	0	2	2	3	6	3	1	1	1
2. PRC		0	1	0	2	2	3	6	3	1	1	1
3. USA		0	1	0	2	2	3	6	3	1	6	6
4. USR Econ		0	0	0	1	1	2	4	2	1	1	1
5. PRC		0	0	0	1	1	2	4	2	1	1	1
6. USA		0	0	0	1	1	2	4	2	1	4	4
7. USR Mil		0	1	0	2	2	3	6	3	6	1	1
8. PRC		0	1	0	2	2	3	6	3	6	1	1
9. USA		0	1	0	2	2	3	6	3	6	7	7
10. USA Mil Presence		8	8	0	1	1	3	7	7	8	1	8
11. USR		8	8	0	1	1	3	7	7	8	1	1
12. PRC		8	8	7	1	1	3	7	7	8	1	1
13. Domestic Stability in X		6	8	6	4	4	7	7	4	7	1	1
14. Status of Hostile US Groups in X		3	6	6	1	1	1	6	2	3	3	3
15. Status of Pro US Groups in X		3	6	6	1	1	1	6	2	3	3	3
16. CP Pro USR Activity in X		1	2	0	0	0	0	6	2	2	1	1
17. CP Pro PRC Activity in X		1	2	0	0	0	0	6	2	2	1	1
18. Current Unit Cap in X		7	6	2	5	5	7	5	5	5	6	6
19. Current Mil Readiness in X		7	6	2	5	5	8	5	5	5	6	6
20. Status of US Citizens in X		6	3	7	0	0	4	4	7	4	4	4
21. Status of US Mil in X		6	3	2	0	0	4	4	6	4	4	4
22. Status of US Prop in X		6	3	1	0	0	4	4	5	4	4	4
23. Status of US Dipl Prop/Pers in X		6	3	8	0	0	4	4	8	4	4	4
24. Pol Rel X-Y		0	3	3	8	9	9	3	7	6	6	6
25. Econ		0	3	3	8	8	8	3	5	5	5	5
26. Mil		8	5	5	9	9	9	3	8	8	8	8

FIGURE 4.3

THE WEIGHTING MATRIX: ASSIGNING RELATIVE WEIGHTS TO INDICATORS
IN THE PROCESSES OF FORMING STATE INTERPRETATIONS

CIA MAPPING

INDICATOR	INTERPRETATION							
	Opposition forces to regime hostile to US likely to die out	Status quo in X upset	X slipping to communists	Threatening elements in X	Hostile forces trying to gain support in X	X is likely to become battle ground between super powers	Communist becoming adventuresome in X	Have opportunity in X to build future assets
	1	2	3	4	5	6	7	8
1. USR, Pol Rel with X	4	3	4	2	2	7	4	3
2. PRC	4	3	4	2	2	7	4	3
3. USA	4	3	4	2	2	7	4	3
4. USR Econ	3	3	3	2	2	6	4	4
5. PRC	3	3	3	2	2	6	4	4
6. USA	3	3	3	2	2	6	4	4
7. USR Mil	3	3	3	2	2	8	4	4
8. PRC	3	3	3	2	2	8	4	4
9. USA	3	3	3	2	2	8	4	4
10. USA Mil Presence	2	4	4	1	3	9	2	1
11. USR	2	4	4	1	3	9	2	1
12. PRC	2	4	4	1	3	9	2	1
13. Domestic Stability in X	7	8	6	4	6	4	7	3
14. Status of Hostile US Groups in X	8	7	7	5	3	2	7	6
15. Status of Pro US Groups in X	5	7	7	5	3	2	6	6
16. CP Pro USR Activity in X	7	4	6	5	2	2	7	2
17. CP Pro PRC Activity in X	7	4	6	5	2	2	7	2
18. Current Unit Cap in X	3	4	3	1	1	3	5	0
19. Current Mil Readiness in X	3	6	3	1	1	3	5	0
20. Status of US Citizens in X	2	3	5	1	1	6	1	0
21. Status of US Mil in X	2	3	5	1	1	6	1	0
22. Status of US Prop in X	2	3	5	1	1	6	1	0
23. Status of US Dipl Prop/Pers in X	2	3	5	1	1	6	1	1
24. Pol Rel X-Y	4	3	2	1	3	3	1	0
25. Econ	4	3	2	1	3	3	1	0
26. Mil	4	3	2	1	3	3	1	0

FIGURE 4.4

THE WEIGHTING MATRIX: ASSIGNING RELATIVE WEIGHTS TO INDICATORS
IN THE PROCESSES OF FORMING CIA INTERPRETATIONS

DEFENSE MAPPING

INDICATOR	INTERPRETATION											
	1	2	3	4	5	6	7	8	9	10	11	12
1. USR Pol Rel with X	2	2	1	5	1	1	3	0	0	0	0	0
2. PRC	2	2	1	5	1	1	3	0	0	0	0	0
3. USA	2	2	1	5	1	3	8	5	0	0	0	2
4. USR Econ	1	1	1	5	0	1	3	0	0	0	0	0
5. PRC	1	1	1	5	0	1	3	0	0	0	0	0
6. USA	1	1	1	5	0	3	6	0	0	0	0	0
7. USR Mil	4	8	7	5	1	3	4	0	0	0	0	0
8. PRC	4	8	7	5	1	3	4	0	0	0	0	0
9. USA	4	8	7	0	1	3	8	0	0	0	0	0
10. USA Mil Presence	8	8	7	0	1	4	8	0	0	0	0	0
11. USR	8	9	7	0	8	8	8	9	0	0	0	0
12. PRC	8	9	7	0	1	7	8	0	0	0	0	0
13. Domestic Stability in X	4	4	0	0	7	5	5	0	0	0	0	0
14. Status of Hostile US Groups in X	1	6	0	9	6	9	2	0	0	0	0	0
15. Status of Pro US Groups in X	1	6	0	9	4	9	2	0	0	0	8	0
16. CP Pro USR Activity in X	1	1	0	0	0	2	2	0	0	0	0	0
17. CP Pro PRC Activity in X	1	1	0	0	0	2	2	0	0	0	0	0
18. Current Unit Cap in X	9	9	9	0	1	4	7	4	0	0	6	0
19. Current Mil Readiness in X	9	9	9	0	1	4	7	7	0	0	6	0
20. Status of US Citizens in X	1	5	0	0	9	4	2	0	0	0	0	7
21. Status of US Mil in X	1	9	0	0	9	7	2	0	5	8	0	5
22. Status of US Prop in X	1	4	0	0	6	7	2	0	0	0	0	9
23. Status of US Dipl Prop/Pers in X	1	5	0	0	9	7	2	0	0	0	0	6
24. Pol Rel X-Y	7	5	5	0	1	1	4	0	0	0	0	0
25. Econ	6	3	3	0	0	1	4	0	0	0	0	0
26. Mil	9	7	7	0	1	4	5	0	0	0	2	0

FIGURE 4.5

THE WEIGHTING MATRIX: ASSIGNING RELATIVE WEIGHTS TO INDICATORS
IN THE PROCESSES OF FORMING DEFENSE INTERPRETATIONS

technique deemed useful. The matrix currently used in the model was first simply created by a graduate student, relying heavily on the collected perceptual statements. This initial matrix was then reviewed and modified by a panel of the project's researchers. Finally, it was tested against a series of actual crises and adjusted further to ensure concurrence with known interpretation in the real world setting. While this careful analysis has led us to place considerable confidence in the matrix, its values remain an option of the user, and may be modified with ease in the simulation program since the matrix (actually three matrices stacked together) is simply a computer file.

Essentially, we are saying that a contextual interpretation is defined as activity in the variables which determine it. With this definition we can formulate a measure for each interpretation called the relative activity score or:

$$\begin{array}{l} \text{Relative} \\ \text{Activity} \\ \text{Score for an} \\ \text{Interpretation} \end{array} \quad \begin{array}{c} N \\ \sum_{i=1} W_i | I_i | \\ \hline N \\ \sum_{i=1} W_i \end{array}$$

where: N is the number of indicators in the data set

W_i is the weight for the i th indicator

I_i is the score of the i th indicator

The numerator of the fraction represents the sum of the weight amount of activity on the subset of indicators defining the interpretation. The denominator simply adjusts this score so that the measure will be comparable to other interpretations with differing weights and possibly a larger or smaller subset. This calculation is performed for each interpretation forming the relative strength vectors for each of the agencies. The residual for each interpretation (1-RAS) is also computed. For each agency these residual scores are averaged producing an estimation that nothing is happening. For each agency this will form a vector with a score for each contextual interpretation or the relative activity vector. The number of entries in each vector is allowed to vary.

The relative activity vector is normalized to a unit length and the subsequent values are obtained under the title probability vectors. Production of this vector allows us to define the first output matrix item; uncertainty. An agency's uncertainty is defined as a function of the variance of its probability vector. The variance measure is modified somewhat so that it will be zero when the maximum variance is present (all interpretations score the mean). In this situation all interpretations are equally likely, and the agency's uncertainty is at a maximum. The output measure varies as a function of (σ^2) from zero to one.

Decision time is defined as the absolute change in uncertainty. If there is

no change in the level of uncertainty, decision time is thought to be high. So that decision time:

$$DT_t = 1 - |U_t - U_{t-1}|$$

where DT_t is Decision Time at time t .

U_t is Uncertainty at time t .

Once a certain level of uncertainty is reached, it will decrease normally rather than being replaced by values of zero. While no change from the previous day would reduce a given day's decision time value to zero, it is thought that the concept is more stable in real world situations.

The threat that any interpretation represented is defined as the sum of the negative scores of the subset which defines it. In order to make this reasonable, the values of some indicators are reversed. For example, a positive value of the indicator political relationships between PRC and X, might be thought of as an act threatening to the US. The reversal of the indicators score accounts for this. The threat calculation is also adjusted for weights of the variables and standardized by the sum of the weights. For each agency the threat of each interpretation is discounted by its value in the probability vector. The sum of these discounted values is reported as the threat value in the output matrix.

One three by three output matrix is produced for each day. This matrix has the form:

TABLE 4.2
Output Matrix for 12/12/65

	Uncertainty	Decision Time	Threat
CIA	.993908	.681875	.900713
State	.993216	.714916	1.151652
Defense	.985644	.649610	1.445038

Production of the output matrix allows us to summarize the model from an overall perspective. First, the data matrix represents the codified environment which is presented to the agencies' monitoring personnel. The agencies then make interpretations on these data, trying to extract patterns. The patterns are a function of both experience, and the agencies' goals and interests. To the degree that several patterns dominate a particular event stream, an agency feels "certain" about the implication of those events.

Should the level of certainty/uncertainty remain fairly static, the perception is that there is a high amount of decision time. However, should the level of certainty/uncertainty show fluctuation, the perception is that the decision time is short.

Also, it is the threat that the particular contextual interpretations present that is of importance. Thus, we have measured the three concepts of uncertainty, threat, and decision time not as indicators (measured directly) but as variables which are complex functions of a set of indicators.

C. The Input Data

The Crisis Warning and Management Project is primarily concerned with demarcating those situations which have been classified as crises. It felt that the best way to get at this demarcation process was to look at the perceptions of organizational actors. The actors chosen were the three primarily foreign policy actors — the State Department, the Central Intelligence Agency, the Defense Department.

The agencies are viewed as receptors of stimuli from an outer environment. It is through their screening devices, based on an internalized image of important situations that these agencies glean some knowledge about what is going on globally. A data set which reflects movement in the outer environment was developed.

This data set has to meet a number of requirements. First it must provide information on a small time frame. Aggregation of the data might then provide information about long-term trends which lead to a crisis. But it would not provide the type of information necessary for an investigation into the short-term dynamics that underlie crisis situations.

Second, given the time frame for our study the data set should provide information on super power interest in at least three distinct areas — military, economic, and political. It is assumed that at the heart of most conceptualizations of threat, there exists a goal structure. For a nation to be threatened, there must be an opportunity for a rival to obtain an advantage over the nation in limiting one of its goals (see Hermann, 1969).

Third, the data set should provide information on US actions as well as other major actions. This would allow a feedback component in the data set. It would allow the US to judge whether a recent act helped or hurt long-term goals in a particular situation.

These types of requirements pointed us in the direction of events data. The analytic decks of event data, however, seemed to be too general. The analytic data sets did not provide enough information on the context of a situation. While the events data format seemed to provide some help in developing generalizations about foreign policy, we needed a finer screening device. It was felt that the context of actions by nations played as important a role in the perceptions of crises as the actions themselves. It was felt that dyadic relations

between a target and actor nation should be also included in the code sheet.

The range of the code sheet is from -4 to $+4$. Negative scores comply with adverse actions toward US interests, while positive scores comply with opportunities for the US to increase its interest.²

This code sheet allowed us to meet our second two criteria. In order to employ it, we had to define a data source that used small aggregations. For this, we chose the WEIS descriptive deck. Since the descriptive deck uses news headlines, we would be able to get a strong inkling of what was going on in the outer environment. This descriptive deck combined with the coding sheet would provide the information which met our criteria and would seem to have face validity in showing movements in the outer environment.

D. Coding the Data

In order to get a fair assessment of how an international crisis got started, we did the following. We went to three sources, which had compiled a list of crises in which the US was involved during the post-war era.³ There was no attempt to determine the degree of definitional reliability among these sources at this stage. It was felt that the reliability question would best be answered when the analysis dealt with the actual question of what a crisis is. That is, do all the crises taken from each of the lists show a common perceptual characteristic, or are each of the lists distinct in some way. The lists were used as starting points for the compilation of raw data, because the data was *not* transformed by the program. It was felt that comparisons were not necessary at this stage.

After the list was compiled each crisis was assigned a start date. The descriptive deck was then run for three months prior to this data as well as three months after this data. This would yield information about movement of perceptions into a crisis situation. A list of the crises with the length of the descriptive deck is provided in Table 4.3.

In order to reduce the length of the descriptive deck for these time periods, events were limited. A program was developed to sort out those events over the time period that dealt with a target nation (the nation in which the crisis occurred) as an actor or object with any other nation as well as all super power activity (US — PRC, PRC — USSR, USSR — USA). This reduced the international environment into a much more manageable one. (Figure 4.6)

While this scheme reduces our ability to talk about the amount of information that occurs in the total system during a crisis, it was felt it provides an accurate estimate of the information presented to a watch officer. Notice that the amount of information considered by a coder is significantly greater than the more normal crisis dyad of two countries.

TABLE 4.3
LIST OF CRISES

<i>Crises</i>	<i>Duration of Descriptive Deck</i>
Angola	8-10-75/4-30-76
Arab-Israeli	2-13-67/9-10-67
Bangladesh	8-25-71/3-14-72
Cambodia	1-14-75/9-11-75
Cambodia 2	10-1-73/5-29-74
Cambodia 4	5-2-73/1-31-74
Cambodia 5	1-2-74/8-31-74
Cuba	11-1-71/6-30-72
Cyprus	8-15-67/3-3-68
Cyprus 1	4-16-74/12-18-74
Dominican Republic-United States	12-24-69/6-26-70
Greece	1-2-67/6-15-67
Haiti	1-2-70/8-31-70
Hong Kong	3-27-67/3-1-68
India-Pakistan	2-4-72/10-6-72
Israel-Jordan 1	9-1-66/4-30-67
Israel-Jordan	10-2-67/6-29-68
Israel-Lebanon 1	9-4-68/5-4-69
Israel-United Arab Republic	7-1-67/2-29-68
Jordan	6-1-70/12-23-70
Jordan-Syria	9-1-66/3-23-67
North Korea-South Korea	9-5-68/4-30-69
North Korea-United States	1-4-69/8-4-69
Laos	11-1-72/5-4-73
Mideast	7-1-73/1-5-74
OPEC	7-1-73/2-28-74
Portugal 1	1-25-74/11-11-74
Pueblo	10-23-67/5-27-68
Rhodesia	1-5-66/7-28-66
Rhodesia-Zambia	10-13-72/5-2-73
Saudi-PLO 1	12-3-72/7-3-73
Sino-Soviet	10-11-66/5-14-67
Trinidad	1-2-70/8-31-70
Turkey-United States	12-4-70/7-8-71
Uganda-Tanzania	6-17-72/1-2-73
Vietnam	1-11-75/8-14-75

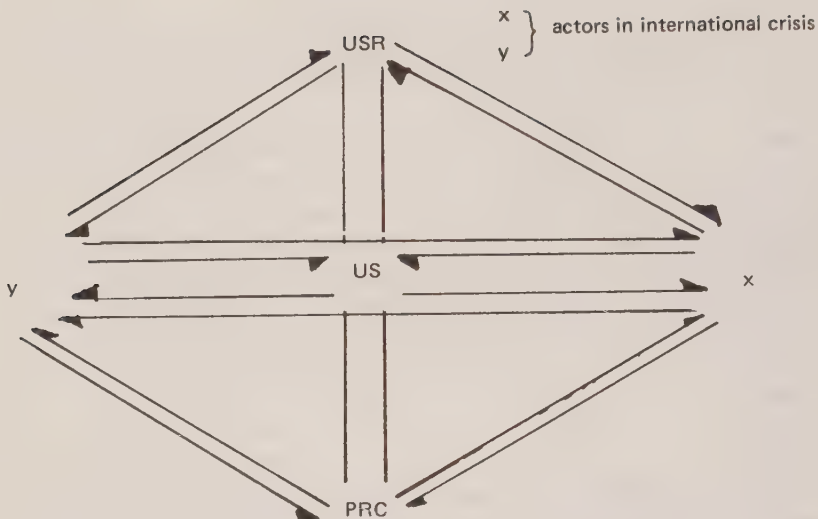


FIGURE 4.6
THE INTERNATIONAL SYSTEM AS DEFINED
BY THE DESCRIPTIVE DECK

Our sortings reduced the descriptive deck to reflect actual information sent to a watch officer. Yet, even this format seemed to provide us with a plethora of irrelevant data (see Table 4.4). There was a tremendous amount of redundant information. There was also a lot of information which was not directly codable. Both points reflect quite accurately the problems faced in every watch office. Every day watch officers must separate the shaft from the wheat. They must carefully weigh cable traffic. But they are overloaded with material coming in from multiple sources around the world. We quickly found that many days had large quantities of information, none of which suggested a change in our basic code sheet.

In order to resolve this issue, the program used in the coding process provided an option that would fill the days when no information was available. These days with no information were assumed to be equivalent to the last day information was available. This assumption allows for us to talk in real time, rather than some arbitrary aggregation. This procedure is based on the assumption that no information implies no change. It may be the case that no information in fact means a lessening of action. This situation was resolved by the inclusion of a decay function in the program which transforms the data into agency knowledge.

TABLE 4.4

AN EXAMPLE OF THE WEIS DESCRIPTIVE DECK USED IN THE CODING
OF EVENT STREAMS OCCURRING IN THE OUTER ENVIRONMENT

11,27,67	UAR SAID IT WOULD NOT PERMIT ISR TO ESTABLISH MILITARY BASES ON UAR SOIL
11,27,67	FRN PRS RESTATED PROFOUND DISPLEASURE WITH ISR FOR REFUSING TO LISTEN TO VOICE OF FRN
11,27,67	ISR PM SAID EMIGRATION OF USR JEWS TO ISR CUT OFF AS RESULT OF JUNE WAR
11,27,67	ISR SAID ARAB RECOGNITION OF ISR NOT ABSOLUTE PREREQUISITE FOR PEACE TALKS
11,28,67	ISR PM REGARDED GENERAL RECOGNITION OF ISR RIGHT TO EXIST AS MOST IMPORTANT DEVELOPMENT PROMPTED BY ME WAR
...	
12,1,67	ISR PLANE WAS DOWNED BY UAR ANTI-AIRCRAFT FIRE
12,1,67	UAR ANNOUNCED THAT IT SHOT DOWN 3 ISR JETS

We chose the day as our temporal domain for coding. This allowed as minute a temporal span as possible. There is no way in dealing with the temporal order of events within a day. Events reported on the same day, are recorded from *The New York Times*. There is no provision for sequential ordering by the *Times* and this is carried over into the WEIS coding. Only when we start speaking of daily aggregation can we begin to employ some sequence to the events that are part of a crisis situation.

The day was chosen as our temporal measure due to the short duration of crises. Larger aggregation would mask changes occurring in the data. Using larger aggregations we might miss the important aspect that context plays. For example, if in a situation on day one a nation offers a cease fire on a border village, the different aggregations would affect our interpretation of the situation. Using daily aggregations, it is clear that the situation is getting better. Using weekly or larger aggregation, the picture becomes blurred. This is because the coder would have to code the ceasefire offer and the border clash as part of the same actions. Any coding technique employed with this larger aggregation would only cloud any interpretation of the situation.

Likewise, it was felt that each of the agencies would receive information on a daily basis rather than on some larger aggregation. The larger aggregations would incorporate an air of inauthenticity into the simulation.

Each coder was advised to go over the WEIS descriptive deck. He was told only the target and actor nations involved in a crisis. The coder made the decision whether an event should or should not be coded. As was previously mentioned, a large percentage of events were ignored. Most of these events related to super power activities in other arenas. It was rarely the case that a target or acting nation were involved in an action which was not recorded. Unfortunately, these actions made up a very small percentage of lines in the descriptive deck.

For practical purposes, the coders were required to have a considerable knowledge of international relations. All the coders had at least an MA in International Relations. The flexibility allowed the coders meant that this data set must be classified as "soft" data. Even with this degree of flexibility, there seems to be a consistency in coding events that leads up to and is part of an international crisis.

E. The Crisis Perception Computer Model

In order to use the Crisis Perception Model (CPM) type:

@ ADD SIM*SIMCLIST.CPM

The model will type a sign-on identification line. It will then ask you if you want to alter the default parameters. This refers to the number of variables in the data set (default = 29), and the number of contextual interpretations per agency (defaults: CIA = 8, DEFENSE = 11, STATE = 12). If you wish to change any of these, merely response "YES" or "Y." If you do not a "NO," "N" or carriage return will suffice. If you change parameters the model will prompt you for each value.

Next the model will ask you if you are going to provide your own weight matrix. This is a matrix which contains the relative weights for each agency's contextual interpretation. Those variables which do not affect an interpretation are weighted at zero. If you answer "NO," the weight matrix designated by the model will be used. These matrices appear in Figures 4.3, 4.4, 4.5.

If you answer "YES" or "Y," the model will ask for the name of the file which contains the weights. There are two procedures which can be used at this point. If you want to build a matrix using the interactive commands below, respond with "ZEROS." This response will cause the model to fill all of the weight matrices with zeros. You can then add weights using the "AWM" command.

If you have already built a matrix using the UOM editor feature, you can direct the model to it by typing the name the matrix was catalogued under (see below). Remember that the model will expect a matrix of M X N where

M = the number of variables (default = 29).

N = the sum of the interpretations (default; $8 + 11 + 12 = 31$).

Next the model will ask for the name of a data set. You can give it the name of any of the library sets, or one that you have created using the data program. If you respond by typing 'LIST' it will tell you the names of the files in the data library.

At this point you have provided the model with the basic information it needs. There are several options or commands which are available to you. These commands are summarized in Table 4.5.

In each case the model will execute the command and return to command level.

F. The "AWM" Command

The "AWM" or 'Alter Weight Matrix' command changes the weights in the weight matrix. Each agency has such a matrix. Its dimensions are determined by

TABLE 4.5

<i>COMMAND</i>	<i>FUNCTION</i>
AWM	Changes entries to the weight matrix.
CALCULATE	Tells the model to begin calculation on the current data set.
DAM	Displays the active weights for any agency. (For each interpretation, the non-zero variables are listed.)
DWM	Display any row from the weight matrix. (It would take a tremendous amount of time and paper to display the entire matrix.)
SET PVPR	Reverses the condition of the punt flag for the probability vectors. Unless this command is issued, the model will not print the probability vectors.
SET TRPR	Reverses the condition of the print flag for the output matrix. Unless this command is issued, the model will not print the probability matrix.
STOP	This stops execution of the model. When encountered, the model will print summary statistics and then move to the plot routine if desired.

the number of contextual interpretations allowable for the agency and the number of variables in the data set.

The command is issued by typing "AWM" a comma and the agency name for example:

AWM, CIA

This command would tell the model that you wish to alter the CIA's weight matrix. The model will respond with the question "WHICH INTERPRETATION." The weights for the designated interpretation will be displayed. Following the display the prompt "alter?" will appear. The "NO" response will direct the model to return to command level. A "YES" response or a return will cause the prompt "Enter Indicators and Weights as Indicator, Weight, Indicator 2, Weight 2, Indicator 3, Weight 3" to appear.

After accepting the response line, the model will display the weights again and ask for alterations. You may continue to alter the matrix. When you respond "NO" to the alter prompt, you will return to command level.

G. The Calculate Command

This command will direct the program to the calculation cycle. One set of probability vectors and one output matrix is calculated for each data entry. After the calculate command is issued, the program will ask, "HOW MANY." You may calculate as few as one data item or the entire data set. If you wish to calculate values for the entire data set, you can respond with a number much larger than the number of lines in the data set.

After the model has performed the mandated number of calculations, it will return to the command level. Consequently, it is possible to calculate output values over some subset of the data, provide for changes in the interpretations and calculate values for the remaining data. Should the program encounter an end of data, it will stop and return to the command level. (Usually the "STOP" command would follow.)

H. The "DAM" Command

The 'DAM' or display active matrix command will display the non-zero values for any agency's weight matrix. This is the only command which will display an entire weight matrix. It is impossible to display the actual values for the weight matrix within size limitations. It is possible to follow a "DAM" command with a "DMW" or "AWM" command, either of these display actual weight values for any row of an agency's matrix.

The command is issued in the form:

DAM, CIA
DAM, STATE
DAM, DEFENSE

I. The "DWM" Command

The "DWM" or display weight matrix command will display any row of any agency's weight matrix. It operates in the same manner as the "AWM" command.

J. The "SET PVPR" Command

This command controls the output of the probability vectors. It can either cause them to be printed, or cause them not to be printed. Each time it is issued, it changes or reverses the current status.

The model always begins with the assumption that you do not want these vectors printed. The first time the command is issued, it will cause the printing to start. The second time would cause it to stop. It is possible to use this command for selective printing of the probability vectors. If, for example, you are interested only in the vectors during the "crisis period" of your data set, you could calculate the output matrix values for the entire pre-crisis period before issuing the command. This would effectively skip the pre-crisis as far as the output of the vectors is concerned.

K. The "SET TRPR" Command

This command operates like the "SET PVPR" command above, only it controls the printing of the output matrix. It is also set to begin in the 'no print' state. As with the "SET PVPR" command, this command can be used for selective printing.

L. The "STOP" Command

This command will terminate the model's compilation after stopping the model. You will receive summary statistics for the run. The program will give you the opportunity to plot any of the information compiled during the run.

This is not the only way to stop the model, however. If you attempt to calculate output matrices for more data frames than there are in your data set, the program will assume a "STOP" after it processes the last data line. Since you will most often want to calculate matrices for the entire data set, you can use this feature to your advantage. It is possible to answer the "HOW MANY" prompt of the calculate command with a very large number. This will calculate matrices for all data entries and then imply a "STOP." This implication will leave you in the same relative location that a normal stop would (i.e. the summary statistics and plots will be available).

M. The Coder

As previously mentioned, it is possible to use the model with already existing data. However, sometimes you may want to code your own data set. The coder program has been designed to help you in this effort.

N. The Interactive Coder

One way to use the coder program is interactively. This means that you will enter the variable values directly into the coder program. In order to use it, you need only have a copy of the events you want to code. Usually, this will be some subset of the WEIS data set.

To access the model after the normal sign on procedure type:

`@ADD SIMCLIST.CODER`

The coder will begin by typing a sign on line. It will then ask if input is to come from the terminal or disc. For interactive use, the proper response is "TERM." The coder will ask if you want to use initial values or last values for replacement. This refers to the rules it will use to 'Fill in' your missing values (this won't make sense yet, but read on!). The program will then ask for an initial vector. This vector represents the state of affairs prior to the first event you intend to code. You must enter one value for each variable. (To make things simple, the example will have only five variables.) The values are separated by commas as follows:

`-1,0,1,2,3`

The values should range from +4 to -4 and always be a whole number.

The model is now ready for data.

To start the process, look at the first event to be coded, and decide which of the variables such an event would affect. Type the variable number and new value, separated by a comma. Repeat this process for as many variables as are affected. Each new entry is also separated by commas as:

Variable #, new value, variable #2, new value #2.

After completing this, enter the date of the coded event. The entire line should resemble:

2,-2,5,-1,05/23/51.

The coder now has enough information to determine the first day of data.

initial vector	-1	0	1	2	3	
changes		2,-2			5,-1	05/23/51
result	-1	-2	1	2	-1	
output line	-1	-2	1	2	-1	05/23/51

Notice that the variables which did not change retained the same values.

The second event to be coded is entered in the same way:

1,2,4,3,5,1,05/26/51

The last value or initial value option is resurrected here (you had almost forgotten, hadn't you?). It affects the process as shown below.

initial values	-1	0	1	2	3	
first day	-1	-2	1	2	-1	
changes	1,2			4,3	5,1	05/26/51
initial option	2	0	1	3	1	
last option	2	-2	1	3	1	
output line initial:	2	0	1	3	1	05/26/51
output line last:	2	-2	1	3	1	05/26/51

Notice that variable number two has a different value under the replacement options.

In order to simulate a day-by-day data base, the coder fills in the days between the changed dates. Consequently, our actual data set now looks like:

(using the last value null)

-1	0	1	2	3	
-1	-2	1	2	-1	05/23/51
-1	-2	1	2	-1	05/24/51
-1	-2	1	2	-1	05/25/51
2	-2	1	3	1	

The above procedure is followed for all the events you want to code. In order to stop the process, type 'END.' The coder will mark the end of your data.

To access the editor, you first must think of a name for the place you intend to put your responses. Once again this must be less than twelve characters. Once you have done this, type:

@ED YOURNAME

Notice there is *NO* period at the end of the name.

There are two modes in the editor. One is for input and one edit (change or review text). The program always lets you know which mode it is in. A blank line will always cause it to change modes. As you enter for the first time, the

machine will type "INPUT." At this point type all the responses as you would for the interactive coder, starting with the first line of numeric doe (initial values). Continue this process until you've coded all your events or you are too tired to go on.

Type a blank line. The machine will respond with "EDIT." Then type the word "TOP." The machine will respond with an asterisk. Then type "NP ★." This will tell the editor to list your input along with line numbers. Look over the output for mistakes if you spot one, type in the line number. The machine will respond by typing that line of text. Then type "DELETE." Type only the word delete. *DO NOT TYPE THE LINE NUMBER.* The machine will respond with an asterisk. Then "insert 4,3,2,1/05/23/51" where 4,3,2,1,05/23/51 is the correct line. When you have corrected all your errors, type the word "EXIT." This will end the editor procedure.

Should you need to save this file overnight, you need only type:

@SAVE YOURNAME

In order to add to a saved file type:

@LOAD YOURNAME

This will reload the file. Then type:

@ED YOURNAME

To find out where you are type:

PRINT LAST

This will print the last line. A blank line will put you into the "INPUT" mode. You can now finish your entry.

No doubt, after all this hard work you will want to save the data for future use with the model. The coder must have a name to attach to your data. It will ask you for a name by typing:

ENTER THE NAME FOR THE FILE

The name you decide upon must be twelve letters (12) or less. You may include dashes or minus signs (—) in the name. The coder will then save your data and enter the name in the data library.

O. Use of the UOM Editor

There are two major drawbacks in using the interactive coder. The first is that all events must be coded at the same sitting. If this is a long time, you incur the risk of the computer 'going down.' Should this unfortunate calamity transpire, rest assured that all of your work will be lost. Also, after several hours in a chair any rearrangement of ones torso provides little relief.

The second major drawback is that mistakes are virtually non correctable in the interactive coder. Suppose in line 57 you meant to type that variable #2

changes to a value of 3, not variable #3 changing to a 2. Now you are at line 59 and you see the mistake. What can you do? Nothing! The coder has permanently changed the value of variable #3.

All of this can be avoided by using the UOM Editor. This device will allow you to work in several sittings. It will also let you make and correct thousands of mistakes. Such luxury does not come cheaply, however. It will mean that you will learn additional procedures. As always, the more complex the procedure used, the more likely the novice is to make unspeakable errors.

What using the editor means is that you will store your responses in the computer, and have the coder read them all at once. The editor is a program which has been written to facilitate the input of information in the computer. Basically, it allows you to input text, look at that text and modify the text in any way. The editor has many features and commands. Yet with knowing just a few you can get by.

In order to use this file with the coder, access it the same way you did in the interactive case. Follow those instructions until the time when you would type the initial values. Substitute typing:

@ADD YOURNAME

The machine will read YOURNAME just as if you were typing the lines interactively. Remember after it reads the file, you must still type "END."

Notes

1. For the purpose of our analysis, it will remain identical. In the world of crisis watch officers, it differs from agency to agency but it does contain significant overlaps.
2. For some of the indicators, a sign reversal was employed.
3. The three sources used in the compilation of the list were: Moore (1975), 'Crisis Inventory'; Blechman and Kaplan (1976), "Use of Armed Forces as a Political Institute"; and CACI (1976), "Use of Armed Forces as a Political Institute"; and CACI (1976), "Planning Problems in Crisis Management."

Appendix

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Chapter V

Seeing is Believing: A Study in Crisis Perception¹

This chapter reports on a study of the early warning process in three agencies of the US foreign policy bureaucracy: State Department, Defense Department, and the Central Intelligence Agency. In each of these agencies, crisis management is a threefold operation:

- 1) Indications monitoring – whereby analysts continually appraise the current world situation. Incoming information is examined for events and trends which differ from the normal state-of affairs resulting in the notification of higher authorities of a possible crisis situation.
- 2) Initial crisis assessment – where the goal is to determine whether or not a crisis exists, and if so what it implies for US interests.
- 3) Threat assessment – wherein the consequences of the crisis situation are determined. Here analysts must attempt to estimate the implication of potential losses upon US economic, political, and military posture.

The reader will note that this is a highly focused study of what is termed early warning in the national security bureaucracy. Thus the results speak primarily to that process. But they are also generalizable to the effort of forming a theoretical basis for early warning in a much wider context. We will address that context after we develop an empirical basis for such theorizing.

A. Perception and the Early Warning Process

We are making an important assumption in this study: National actors do not simply respond to facts in their outer environment. In order for a national actor to interpret and understand what is going on, there must be a filtering mechanism that searches for some sort of pattern to events. The kind of information obtained from such a search is generally expressed in factual terms even though the terms are influenced by the context in which they are received and by the perspective of the observer. These components of understanding come together in the pattern recognition routine of national agencies charged with early warning.

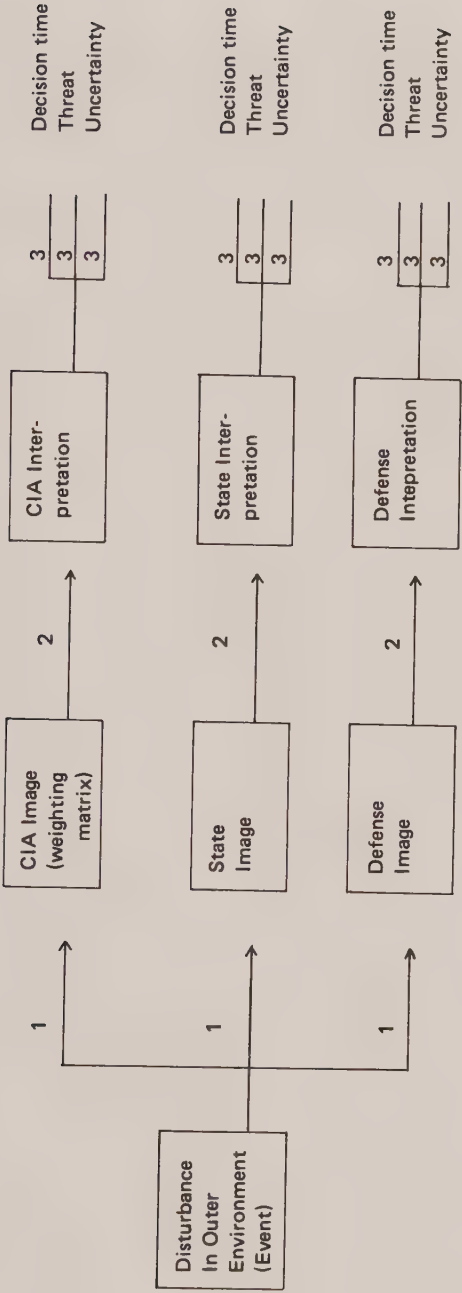
A rather mundane example of this form of pattern recognition is found in those innumerable fictional encounters over the importance of some fact between Sherlock Holmes and Dr. Watson. Given Holmes' self-image as a detective, he may deduce from a footprint the height or weight of a potential perpetrator. At the same time Watson either completely ignores the evidence or feels it is an insignificant fact given the numerous amount of footprints. It is Holmes' self-image and 'years of experience' which allows him to deduce the importance of the evidence. Yet, at the same time Watson who is primarily a chronicler ignores the important evidence.

Like this difference between Holmes and Watson, international actors also place "facts" within some context. In the past, this concern with a national actor's image has been on either an individual level (Holsti, 1969) or on a national level (Boulding, 1956). The research reported in this paper looks at perceptions at an agency level. It is assumed that each of the agencies dealing with foreign policy in the United States — the State Department, the Defense Department, and the Central Intelligence Agency provide the foreign policy community with a perception of the environment. These perceptions are based on the image the agency has of its outer environment. Further, after these environmental disturbances are filtered through an agency's image, the agency gains some knowledge — an interpretation of the dynamics of its environment. These interpretations in turn are estimates of the degree of stress in a situation — threat, decision time, and uncertainty. A visual interpretation of this perceptual framework is repeated in Figure 5.1.

The focus of this study, the agency image, is seen as being stable over reasonable lengths of time. Each of the arrows in the framework is understood to be a type of interpretation that will be portrayed in the model.

The initial arrows address the coding of data about actions occurring in the international environment. The second set of arrows defines the interpretation of this original coding after it is filtered through an agency's image. The final arrows depict the transformation of this knowledge into perceptions of decision time, threat, and uncertainty.

At the heart of any early warning system is a process of pattern recognition whereby agencies attempt to estimate what is going on in the outer environment and what that activity implies for the future. As events in the environment are reported upon through cable traffic or other sources, the desk officer or other monitoring station personnel form strategies of recognition that help them interpret the raw information. These recognized patterns form the basis for an evaluation of threat, uncertainty and reaction time associated with the unfolding events.² At the core of this process is the perceiver's image of the environment. All analysts have a feel for what is going on in the world. This image contains assumptions about the conditions and relations that exist in the relevant environ-



1. Coding of International Environment
2. Transformation of Events into Interpretations.
3. Transformation of Events and Interpretations into Perceptions of Decision Time, Threat and Uncertainty.

FIGURE 5.1
THE PERCEPTION PROCESS IN THE FOREIGN POLICY BUREAUCRACY

ment. This feeling for reality or model of reality plays an important part in the successes and failures of early warning.

In an evaluation of the current foreign policy bureaucracy, Louis Halle argues that the foreign policy of a nation addresses itself not to the external world as is commonly asserted, but to an image or images of the external world. "In the degree that the image is false, actually and philosophically false, no technicians, however perfect, can make the policy that is based on it sound."³

It is the intent of our research to evaluate alternative images of reality held by the major agencies in the United States early warning process. Agencies have specific and different images⁴ and these images are of varying degrees of relevance for today's world. The methodological perspective of this research is quite different from the normal empirical research strategy in international relations. In most empirical analyses today, analysts attempt to construct forecasts or explanations of aspects of the environment. They search for the occurrence of patterns or the sequencing of events. Their success or failure is dependent upon the closeness of fit between one pattern and another.⁵ In contrast, we are attempting to understand how decision algorithms respond to or adapt to conditions in the environment. We are not as interested in whether the environmental conditions will actually occur at a particular point in time or in identifying a particular decision algorithm as we are in comparing algorithms.

To some extent the differences are merely over philosophical starting points. We are concerned that the environments studied are historical crises and we have taken considerable effort to represent accurately the images of the three agencies. Our point of departure from more familiar forms of analysis is over what one does with the empirical evidence. What is a "good exercise?" In our perspective, it is less an analysis of the fit of our interpretations to the "real" images of each agency than it is a comparison of how these images deal with or handle specified problems: the 36 crises of the 1966-75 period. The approach flows from an artificial systems perspective (Simon, 1969; Bennett and Alker, 1977; Phillips and McCormick, 1977; Thorson, 1972). It relies heavily on a cybernetic paradigm of politics (Deutsch, 1953; Phillips and Thorson, 1975).

In order to study these aspects of the early warning process, our focus must shift from studying the outer environment to modeling the structure of information processing within the agencies involved in early warning. Useful models of this process must go beyond preserving the input-output relationships of each agency to characterizing the manner in which information is transformed into interpretations of the outer environment.⁶

B. The Way Agencies Respond to Crises

In order to analyze differences in agency interpretation of critical events in early warning, a simulation was developed and employed. The model takes daily observations of events in the international arena places them into the indicator system which in turn transforms the information into the output measures described above. To accomplish the analysis, 36 crises which occurred over the period 1966-1975 were coded into indicator data and then evaluated by the model.

The list of crises used was compiled from several sources involved with the description of crises in the post-World War II period.⁷ Table 5.1 presents the compilation of the sources and the actual crises used.

In order to exercise the model, a particular date was designated as the crisis day. The time for the coded information was three months prior to and three months after the "crisis day." Each coded crisis, then, consists of an event stream six months long.

The most easily accessible event stream used for coding is the "WEIS" descriptive deck. This data set provides one or two sentence statements about an occurrence in the international system. While the liabilities of this data set have been much discussed (Phillips, 1972; Azar, 1972), it is a reasonable data source for our usage since we are primarily concerned with finding a reasonable calculus for the translation of an action into the two types of perceptual outputs provided by the model. The WEIS descriptive deck is employed as a facsimile of the "event stream" that a desk officer might be looking over.

The descriptive deck was coded on 26 indicators for each of the days in the six-month period. Coders were told who the major actors were in the crisis. This was necessary to focus the coding of events on those pertinent to the crisis under study. Early warning watch officers know over which countries they have responsibilities. Table 4.4 presented an example of the data which would be used by one of the coders. Each crisis file contained all exchanges in which the crisis nation was either an act initiator or act recipient. In addition, all major power exchanges were pursued.

After looking at a day's worth of events, the coder would then code the *day* on an indicator sheet. Daily aggregations were used since this is the smallest valid time frame in which the sequence of events is maintained in the WEIS descriptive file.

Once this data was collected, it would then be transformed by the weighting matrix which provides each agency's image of its environment. Thus, each agency in this run of the model is provided with identical amounts of information. The difference in agency perception is determined only by agency image. We fed the model indicators of each day on the six-month period of all 36 crises.

TABLE 5.1
LIST OF CRISES

<i>Crises</i>	<i>Duration of Descriptive Deck</i>
Angola	8-10-75/4-30-76
Arab-Israeli	2-13-67/9-10-67
Bangladesh	8-25-71/3-14-72
Cambodia 75	1-14-75/9-11-75
Cambodia 73-74	10-1-73/5-29-74
Cambodia	5-2-73/1-31-74
Cambodia 74	1-2-74/8-31-74
Cuba	11-1-71/6-30-72
Cyprus	8-15-67/3-3-68
Cyprus 1	4-16-74/12-18-74
Dominican Republic-United States	12-24-69/6-26-70
Greece	1-2-67/6-15-67
Haiti	1-2-70/8-31-70
Hong Kong	3-27-67/3-1-68
India-Pakistan	2-4-72/10-6-72
Israel-Jordan 1	9-1-66/4-30-67
Israel-Jordan	10-2-67/6-29-68
Israel-Lebanon 1	9-4-68/5-4-69
Israel-United Arab Republic	7-1-67/2-29-68
Jordan	6-1-70/12-23-70
Jordan-Syria	9-1-66/3-23-67
Korea	9-5-68/4-30-69
North Korea-United States	1-4-69/8-4-69
Laos	11-1-72/5-4-73
Mideast	7-1-73/1-5-74
OPEC	7-1-73/2-28-74
Portugal 1	1-25-74/11-11-74
Pueblo	10-23-67/5-27-68
Rhodesia	1-5-66/7-28-66
Rhodesia-Zambia	10-13-72/5-2-73
Saudi-PLO 1	12-3-72/7-3-73
Sino-Soviet	10-11-66/5-14-67
Trinidad	1-2-70/8-31-70
Turkey-United States	12-4-70/7-8-71
Uganda-Tan Eania	6-17-72/1-2-73
Vietnam	1-11-75/8-14-75

For many days indicators did not change. When they did change, however, the models produced new interpretations and new estimates of threat, decision time and uncertainty. The remainder of this chapter reports these results.

C. Which Indicators Were Employed

Before addressing individual agencies, a review of the indicator code sheet is imperative. The use of indicators addresses the complexities of a crisis. If a wide variety of indicators were used to describe a crisis, it might depict a situation that encompasses many issue areas as well as many actors. If, however, use of indicators for a particular crisis is limited, the indicators provide only a limited amount of information about the crisis situation. Coding in a single issue area may reflect different degrees of agency involvement in perceiving the crisis. Those crises that use only a small number of indicators are not necessarily simple crises. Rather, these crises are limited only in terms of alternative interpretations. Thus they represent "cut and dry" situations.

The range in employment of indicators to signal crises information is from two to thirty (Table 5.2). In general, indicators of Chinese and Soviet Involvement in pre-crises activity seems minimal. The only significant indicator of Soviet involvement is its political activities. It appears that classic cold war confrontation rhetoric has had very little salience to this era in US crisis diplomacy. This position is also supported by the ranking of indicators signalling US direct military involvement in pre-crises behavior. These indicators were more salient than Soviet or Chinese indicators but they trailed far below the frequently employed indicators.

The frequently employed indicators tell an interesting story. The 1965-1975 period has seen a considerable number of crises from the perspective of the United States. These crises appear to have been of two particular forms. One type deals with US political or economic relations with a particular host country. It usually happens within the context of Soviet political relations. It may also affect economic or diplomatic property within that country. This form of crisis frequently centers around domestic stability or shifts in the power position of groups friendly with one of the super powers. The other major crisis scenario involves conflict erupting between two antagonists. These crises are signalled by political or military relations between country X and country Y taking a turn for the worse. In these crisis scenarios the security of US property and citizens is frequently a source of concern.

The indicator system has a certain face validity. These crisis types appear realistic. We would not expect heavy US military involvement at the outset of crises with the major exception of Vietnam. Major power confrontations have

TABLE 5.2
RANK ORDER OF INDICATORS
BY FREQUENCY OF EMPLOYMENT IN CRISES

<i>Indicator</i>	<i>Frequency</i>
USA political relations with x	30
Political relations $x \leftrightarrow y$	27
Current unit capability of x	26
Domestic stability in x	25
USR political relations with x	23
Military relations $x \leftrightarrow y$	23
USA economic relations with x	22
Current military readiness of x	21
Status of US economic property in x	21
Status of US diplomatic property/personnel in x	20
Status of hostile US groups in x	19
Status of pro-US groups in x	18
Status of US citizens in x	18
Economic relations $x \leftrightarrow y$	17
Status of US military in x	16
USA military presence	15
USA military relations with x	14
PRC political relations with x	11
CP pro-USR activity in x	10
USR economic relations with x	8
USR military relations with x	8
CP pro-PRC activity in x	7
USR military presence	5
PRC economic relations with x	4
PRC military relations with x	3
PRC military presence	2

also been minimal.⁸ In today's crisis planning cycles in the United States, strategists frequently make use of a series of ideal type crises against which US military capability is evaluated. This set of potential crises usually contains an attack on the US, a war in Europe, an Arab-Israeli confrontation, a war in Korea, and perhaps one other confrontation. Table 5.3 suggests strongly that such a list of crises is heavily skewed in inappropriate directions if the US is to be prepared

to recognize crises in the future. In order to do a better job in early warning, a new list of crises to prepare for is necessary. It should be skewed more heavily to early warning of political shifts in third world countries and to the United States' role as a third party observer in many areas of the world.

What this section explores is how the matrix has transformed movements in the indicator set into generalized interpretations about the foreign policy process. Each agency has a set of alternative contextual interpretations for crises. These interpretations can shift from day-to-day in the early warning process. Table 5.3 lists the modal interpretation of each crisis. When crises showed a significant

TABLE 5.3a
FREQUENCY OF MODAL INTERPRETATIONS FOR CIA

CIA MAPPING	INTERPRETATION							
	1	2	3	4	5	6	7	8
	Opposition forces to regime hostile to US likely to die out	Status quo in X upset	X slipping to communists	Threatening elements in X	Hostile forces trying to gain support in X	X is likely to become battle ground between super powers	Communists becoming adventuresome in X	Have opportunity in X to build future assets
Frequency of Crises in which the Interpretation was found as a Modal Category	2	11	4	7	22	29	3	4

TABLE 5.3b
FREQUENCY OF MODAL INTERPRETATIONS FOR STATE

STATE DEPARTMENT MAPPING	INTERPRETATION									
	Territory of X violated	Situation in X likely to lead to conflict	Situation in X creating hostages	X occupied Y (aggression)	X occupied Y (protect rights)	X aggression on Y	Situation in X deteriorating	Others may be drawn into conflict with X	Likelihood of war increased	X & Y conflict, US committed to X
	1	2	3	4	5	6	7	8	9	10
Frequency of Crises in which the Interpretation was found as a Modal Category	30	17	6	8	8	1	2	0	3	2

shift in interpretation both modal categories were included. The Central Intelligence Agency seems concerned over two potentialities in these crises. They frequently see it as likely that the country being analyzed will become a battleground between super powers and that there is a danger that leaders hostile to the US will take over the government of the country. The State Department is sensitized by some of the same concerns but it sees these issues in more general terms. It is frequently concerned with issues of territorial sovereignty. This latter issue is similar to the Defense Department's concern over potential attacks on individual countries by hostile forces. The Defense Department demonstrates a much more radical position to crises, however. It sees them as primarily a question of the US reserve to fight. This was a familiar slogan of the period immediately preceding Vietnam. If our coding of agency sensitivities is correct, it seriously influences early warning in the Defense Department. The final Defense sensitivity is to the potential defeat of forces supplied and trained by the United States.

TABLE 5.3c
FREQUENCY OF MODAL INTERPRETATIONS FOR DEFENSE

DEFENSE MAPPING	INTERPRETATION										
	Y in position to attack X	X may attack US ally before US can respond	X has new strat capability	there is a communist threat in X	US citizens in danger	hostile forces cap. of interfering w/US interests	X is questioning our reserve to fight	limited attack on US likely	US units under attack	lost contact with US unit	forces friendly to US being overrun
	1	2	3	4	5	6	7	8	9	10	11
Frequency of Crises in which the Interpretation was found as a Modal Category	10	0	5	0	5	2	31	1	4	4	12

Here we have confirmation of the classic differences in the three agencies. Defense sees the world in terms of military forces and the will to fight. State sees questions of sovereignty and the conflict potential of current positions. The Central Intelligence Agency looks at indicators in terms of the game of future control of each country.

Yet another form of analysis on this data set leads to information as to the dynamic nature of agency interpretations. To code shifts in interpretation we coded for every day that there was a change in indicators. On days in which there were no changes in indicators, we did not have a shift. Frequently, even with a change in indicators, no shift in model interpretations occurred. Tables 5.4-5.6 provide matrices of the frequency of shift. State Department (Table 5.4) shows the most activity in reinterpreting a crisis; in this case shifts in concern over the traditional territorial integrity issue and the saliency of super power

TABLE 5.4
FREQUENCY OF TRANSITION IN
STATE DEPARTMENT INTERPRETATIONS

STATE DEPARTMENT MAPPING	FOLLOWING INTERPRETATION	PRECEDING INTERPRETATION										
		Territory of X violated	Situation in X likely to lead to conflict	Situation in X creating hostages	X occupied Y (aggression)	X occupied Y (protect rights)	X aggression on Y	Situation in X deteriorating	Others may be drawn into conflict with X	Likelihood of war increased	X & Y conflict, US committed to X	X & Y conflict, committed to both
		1	2	3	4	5	6	7	8	9	10	11
1	Territory of X violated	24	22	5	6			1		2	1	1
2	Situation in X likely to lead to conflict	27	11	2	2							
3	Situation in X creating hostages	2	3	3								
4	X occupied Y (aggression)	5	2		5	9	1	3				
5	X occupied Y (protect rights)	4	1		9	12	1	2				1
6	X aggression on Y	1										
7	Situation in X deteriorating				1	1		1			1	
8	Others may be drawn into conflict with X											
9	Likelihood of war increased	1			1	2					2	
10	X & Y conflict, US committed to X	3								2	4	2
11	X & Y conflict committed to both	1	1								2	1

N = 194

politics. While the latter interpretation was a clear preference of the Kissinger State Department it appears to be the same in the current administration. Thus, while oscillating, concern is likely to continue in diplomatic early warning.

The Department of Defense (Table 5.5) was almost as volatile in interpretations as the State Department. Here, however, there is a more complex dynamic. There is a three-step sequence in these interpretations. Defense sees an issue in terms of the likelihood of an attack on a third country (1), the defeat of forces friendly to the US (4), and as a question of our will to fight (7). It appears to be the case that one interpretation leads to another with an eventual oscillation between the latter two.

Finally, the CIA (Table 5.6) seems to be the most stable of the three in interpretations of crises. Here the major cycle is that a potential fall of friendly governments to hostile forces will create an arena for US-Soviet confrontation. There is also a minor cycle which feeds these concerns. Here, the status quo in a country is threatened thereby throwing the situation into a potential conflict with other major powers. There are a number of crises (8) in which upsetting of the status quo is the only perceived outcome of domestic instabilities. The agency is a clear supporter of status quo politics when such a policy agrees with their perception of US interests.

D. How Much Threat is There?

The "Chicken Little" phenomena in early warning is by now a familiar occurrence. Just how much threat really exists? How can we be sure of its interpretation? These questions are beyond the scope of this paper. Indeed they may not, in principle, be able to be addressed. There are a number of related questions which are worthy of considerable attention, however. What is the degree of agreement between agencies as to the amount of threat in a given context? Do the differences point to clear trends in the perception of threat?

In order to compare agencies' interpretation of the amount of threat in each situation under study, we identified the maximum amount of threat assigned to each crisis situation. We then aggregated the crises by reference to who saw the most threat. Table 5.7 presents these rankings. The State Department saw 27 of the 36 crises as more threatening than the other agencies. In 5, Defense saw the most threat and in 4, CIA was most concerned. Most crises in which the US was an interested third party place the State Department in the lead in seeing threat. These threats are not to the US directly. Rather they were, as we have seen previously, threats to diplomatic procedure and to peace. In 19 of the 27 the Defense Department placed second in ranking threat. The differences between Defense and CIA in ranking threat seems to involve the importance of

TABLE 5.5

FREQUENCY OF TRANSITION IN
DEFENSE DEPARTMENT INTERPRETATIONS

DEFENSE MAPPING	PRECEDING INTERPRETATION	FOLLOWING INTERPRETATION										
		Y in position to attack X	X may attack US ally before US can respond	X has new strat capability	trans of nuclear capability	US citizens in danger	hostile forces cap. of interfering w/US interests	X is questioning our reserve to fight	limited attack on US likely	US units under attack	lost contact with US unit	forces friendly to US being overrun
		1	2	3	4	5	6	7	8	9	10	11
1	Y in position to attack X	7		3				17				
2	X may attack US ally before US can respond											
3	X has new strat capability	1		3				8				
4	there is a communist threat in X											
5	US citizens in danger					1	1	2				1
6	hostile forces cap. of interfering w/US interests							2				
7	X is questioning our reserve to fight	13		6		5	1	18		2	2	11
8	limited attack on US likely							1				
9	US units under attack							2		1	1	1
10	lost contact with US unit							2		1	1	1
11	forces friendly to US being overrun						3	12		2	2	4
12	seizure of US property							3		1	1	2

N = 149

TABLE 5.6
FREQUENCY OF TRANSITION OF CIA INTERPRETATIONS

CIA MAPPING FOLLOWING INTERPRETATION	PRECEDING INTERPRETATION							
	Opposition forces to regime hostile to US likely to die out	Status quo in X upset	X slipping to communists	Threatening elements in X	Hostile forces trying to gain support in X	X is likely to become battle ground between super powers	Communists becoming adventuresome in X	Have opportunity in X to build future assets
	1	2	3	4	5	6	7	8
1 Opposition forces to regime hostile to US likely to die out				1	1		2	
2 Status quo in X upset	1	2	3		8	4		1
3 X slipping to communists		2	2		1	2	1	
4 Threatening elements in X				1	2	1		
5 Hostile forces trying to gain support in X		7	1		1	20		
6 X is likely to become battle ground between super powers		5	1		18	18		1
7 Communists becoming adventuresome in X		1	1		1	1		1
8 Have opportunity in X to build future assets			1			1		2

N = 116

TABLE 5.7
RANK ORDER OF AGENCY FOR CRISES ON MAXIMUM THREAT

<i>STATE > DEFENSE > CIA</i>	<i>STATE > CIA > DEFENSE</i>	<i>DEFENSE > STATE > CIA</i>	<i>CIA > STATE > DEFENSE</i>
Uganda	Hong Kong	Laos	Sino-Soviet
Cyprus 74	Rhodesia-Zambia	N. Korea-US	Vietnam
OPEC	Lebanon-Israel	Jordan	Greece
Cambodia	Korea	Arab-Israeli	Angola
Israel-UAR	Rhodesia	Cambodia 75	
Portugal	Turkey-US		
Cyprus	Haiti	N = 5	N = 4
Saudi-Plo	Pueblo		
Jordan-Syria			
Dom-Rep	N = 8		
Cambodia 73-74			
India-Pakistan			
Israel-Jordan 1			
Tanzania			
Cambodia 74			
Israel-Jordan			
Cuba			
Mideast			
Trinidad			
Bangladesh			

N = 19

stability versus the threat to US persons, property, or weapons. When there is a clear potential need to send in troops to protect US property or personnel, the Defense Department sees a potential for threat.

The five crises highlighted by Defense estimates of threat involve direct threats to military posture or to military units. For instance, the sensitivity of DOD early warning routines to the Korean tree pruning episode. In those situations in which the CIA leads in estimates of threat, shifts in government or the fall of governments plays an important part. Vietnam in this analysis focuses on the fall in 1975. The anomaly is the Sino-Soviet crisis of 1966-67.

To summarize these findings, it appears that crises have presented a type of threat to US interests most salient to the State Departments' concerns. In these crises there is frequently grounds for Defense concern that it may be called upon to rescue or protect US citizens or property. To the degree that instabilities affect the traditional status quo supportive of the United States, the CIA is concerned. In those crises which trigger extreme estimates of threat by the Defense Department, they are sometimes overly sensitized by small scale isolated military incidents. If the future continues like the recent past, US early warning would be well advised to focus more upon threats to the territorial integrity of others and to peace in the third world than to direct military involvement of US forces. Its concern for US property and citizenry suggests that early moves to minimize their danger would minimize the pressures to intervene militarily.

E. How Important are Time Constraints in Crises?

The pressures to act are great in a crisis. The initiative must be seized! The longer we wait, the fewer options are left open to us! These and many other slogans are by now famous calls to action. But how do the agencies differ in their desire to act quickly. Table 5.8 addresses this issue. In order to achieve a more reasonable comparison, we moved to a standard identification of the day in which the crisis was to have started and asked how much decision time was seen by each agency for that period.

The results are unequivocal. It is the State Department which sees the least amount of time to act. In 18 out of 26 crises, State sees the greatest need to act quickly. They are not however the same crises in which they saw threat! While several crises calling for action by State are seen as high threat by them, the trespassing episode in North Korea, Vietnam, Jordan, Laos, and Greece were all seen as crises in which quick action was necessary. The CIA saw 12 crises in which quick action was more desirable than did State or Defense. This set of crises included most of the minor Mid-East and several African crises. Defense saw only six crises as most constrained by time demands. These included

TABLE 5.8

RANK BY AGENCY FOR DECISION TIME
ON INITIAL DAY OF CRISIS*CIA > Defense > State*

Bangladesh
Cyprus 1974
Haiti
North Korea-United States
Laos
Portugal
Pueblo
Rhodesia
Saudi-PLO
Trinidad
Uganda-Tanzania

N = 11

Defense > CIA > State

Greece
India-Pakistan
Israel-United Arab Republic
Jordan
Korea
OPEC
Vietnam

N = 7

State > Defense > CIA

Rhodesia-Zambia
Sino-Soviet

N = 2

Defense > State > CIA

Cambodia
Cambodia 73-74
Angola
Arab-Israeli
Cuba
Hong Kong
Israel-Jordan 1
Israel-Jordan
Lebanon-Israel
Turkey-United States

N = 10

CIA > State > Defense

Cyprus 1967
Cambodia 1974
Jordan-Syria
Middle East

N = 4

State > CIA > Defense

Dominican Republic
Cambodia 1975

N = 2

Dominican Republic and Cambodia; both crises in which they had to take significant actions immediately.

The conclusions seem to be straightforward again. Those events that galvanize the Defense Department into demands for quick action do not occur very frequently. The outer environment has simply not been relevant to Defense Department concerns. Fast action has been perceived as necessary in response to diplomatic initiatives or to influence shifts in the status quo, but these are concerns of the State Department or the CIA. It has not frequently been the case that quick action to defend US military capability has been deemed necessary.

F. How Assured are Agencies of Their Interpretations?

The final table (Table 5.9) addresses the issue of uncertainty. This analysis highlights differences in uncertainty over interpretations of the same set of indicators. One interpretation of this table is obvious. The Defense Department is rarely less certain of its indicators than the other agencies. Only in the case of the Cuban situation of 1971-72 did the Defense exhibit more uncertainty than the other agencies. The issue breaks down into two sets of crises; those in which the CIA saw the situation as most uncertain and those in which the State Department saw the situation as most uncertain. Here the differences seem directly attributable to the importance of diplomacy and stability respectively. In those issues in which the question of change in government was imminent, the uncertainty on the part of the CIA was highlighted. In those in which diplomatic initiatives were obviously called for, State led the three agencies in uncertainty.

G. Putting the Pieces Together

The research reported on in this chapter dealt with distinctions between the manner in which models of the three agencies' early warning systems responded to events. Our intention was to identify differences in descriptions of the crisis and of interpretations of threat, decision time, and uncertainty. Rather extensive differences were found. These differences seem related to the relevancy of particular agency images to the current era of international crises. While we believe we have tapped accurately the three agency images, we are conscious of the potential for disagreement. Since we are dealing with flexible simulation models, we can easily analyze alternative indicator systems, interpretations or weighting matrices. We plan to do just that in the future. Assuming for the

present, that we have tapped the agency images we still would suggest that there is considerable room for improvement.

In short, these findings suggest that the State Department image of the state of affairs in the international environment was instrumental in terms of its sensitivity in interpreting events. This agency seemed to fluctuate most frequently to changes in indicators, to see more threat, less certainty, and more of a demand for action than either Defense or CIA. Yet, is the State image of the world accurate? It is, if as we believe the US is to be sensitive to the territorial integrity of others, to threats to the peace, to security of sovereign states and concerned with American citizens, property, and economic interests abroad.

TABLE 5.9
RANK BY AGENCY FOR UNCERTAINTY
ON INITIAL DAY OF CRISIS

State > CIA > Defense

Arab-Israeli
Bangladesh
Cambodia 74
Cambodia
Cambodia 73-74
Cyprus 74
Greece
Korea
Israel-Jordan
Israel-Jordan 67
Israel-United Arab Republic
Lebanon-Israel
Middle East
Rhodesia
Rhodesia-Zambia
Saudi-PLO
Uganda-Tanzania
Vietnam

N = 18

CIA > State > Defense

Angola
Cambodia 75
Cyprus 67
Dominican-Republic
Haiti
Jordan
Jordan-Syria
Laos
Hong Kong
North Korea-United States
OPEC
Portugal
Pueblo
Trinidad
Turkey-United States
Sino-Soviet
India-Pakistan

N = 17

Defense > CIA > State

Cuba

N = 1

But what of the other interpretations, how do they stack up in this game of cards? Not so well we feel. If the United States' position is to be one of supporting the status quo, of being sensitive to quick action today to avert shifts in alignment in the future, then the CIA image is appropriate. It was indeed potentially relevant to many crises. To some extent the CIA image is accurate. It is sensitive to stability and to the concomitant implications of this stability for US interests around the world. Its willingness to equate these shifts to threat and to call for action gives pause for concern, however.

Finally, the Defense Department image of the world seems simply irrelevant for today's world. It sees crisis in terms of major power confrontation, direct military conflict and tests of US fighting will. Since this is its image, it sees little threat, uncertainty or need for action. Perhaps it is appropriate to let the giant sleep. But we are concerned in that this image calls for military action to protect US citizens, property and economic interests and as such seems to play the swing position between the other two agencies in interpretations. Only in the case of uncertainty was it clearly last. Thus we are concerned that if our interpretation of its image is correct and it is left alone, the final administration's interpretation can be affected by an image which shows little relevance to today's world.

Notes

1. This material has been adapted from the original version which appeared in *To Augur Well*, 1979, pp. 237-270. With permission of Sage Publications.
2. These concepts are given meaning in Hermann, 1969.
3. Halle (1960) pp. 316, 318.
4. That these agencies have different images is not a new claim, see Axelrod (1976), George (1969), Scott (1969), and Graham (1976).
5. For an excellent description of this approach, see Singer (1972).
6. For a development of this terminology, see Thorson (1972).
7. Moore (1975); CACI (1976); Blechman and Kaplan (1976).
8. The sole exception is the Yom Kippur War episode.

Chapter VI

The Analysis of Perception

A. Introduction

Up until this point we have attempted to describe a sample of United States crises. The output from the Crisis Perception Model was treated as nominal or ordinal data. By doing this insights regarding the pattern of perceptions across the set of crises were gained.

The chapter looks at the information provided by the model in more detail. The information provided will again be used as output of the model, but when appropriate, it will be treated as interval data. The data will be used to analyze two important issues in the area of crisis demarcation. First, an agency's perception in the early warning processes will be scrutinized for definite patterns. Second, the interrelationship between agency perceptions within a single crisis will be examined.

The analysis of early warning processes provides a dynamic view of the onset of crises. In the early, pre-crisis periods of any situation, the interpretation of developments is heavily based upon analysts' images of past behavior. As noted by Brady (undated, p. 1), "situational qualities in crisis recognition are those dimensions of other nation's past or future behavior perceived by policy makers, which have the capacity to vary over the short-term, and present the most temporally immediate external influences on foreign policy."

In this chapter we will investigate whether or not international crises provide points on which agencies coalesce. International crises are temporal periods in which governmental leaders are the primary decision makers. But their decisions are only as good as the information on which they are based. In the case of a governmental leader it is important that he know the reasons for differences of opinion. Does an international crisis imply that the perceptions of each agency will be identical or conflicting? If there are conflicting perspectives, are they beneficial or dangerous to the management of crises?

The theoretical and analytical arguments are mixed on this topic. Daniel Ellsberg for example (*Papers on the War*, 1972, p. 118) claims that the President and his Secretaries of State and Defense had a great deal of control over the types of information on the Vietnam war. They were accepting reports that

supported a President's position while rejecting the more pessimistic reports. While the Ellsberg argument does not provide information on the nature of the mix of bureaucratic perceptions, there is a hint of the process. In their attempts to please their superiors the agencies would likely provide information which corroborates not only the President's positions but supports the other agencies' evidence as well.

The other perspective which suggests that there is a considerable degree of mix in agency perceptions presented to the President is best seen in Robert Kennedy's account of the Cuban Missile Crisis (1969). In a chapter entitled "Some Things we Learned," Kennedy notes that representatives of the Pentagon, CIA, and AID must have a sounding board in addition to that provided by the State Department. These other agencies were seen as providing information, intelligence, opinion and judgments which were quite contrary to those offered by the State Department (p. 93).

We will want to see how the perceptual models built in the computer simulation fare in this debate. When the weighting matrices were designed each agency was treated as a separate entity. Interpretations and weightings were devised for each agency without consideration of other agency codings. An examination of those aspects of the model which are common to all three of the agencies — threat, decision time, and uncertainty — will determine how incremental developments in the building of the simulation relate to the larger bureaucratic milieu.

B. The Data

To investigate the early warning process and the perceptual mix, we will concentrate on the threat, decision time, and uncertainty outputs for each agency. Threat, decision time, and uncertainty were chosen for several reasons. First, this data can be treated as interval data. The type of analysis planned in this paper — an investigation of correlations — calls for the use of interval data. More importantly, these characteristics of the agencies are common to all three agencies. These three indicators will provide an opportunity to compare identical aspects of perception. The comparison of interpretations between agencies can only be done in a less rigorous manner. It appears to be a fairly difficult task comparing a statement like "seizure of United States property" with "have opportunity in X to build future assets." Unlike threat, decision time, and uncertainty, the interpretation aspect of the model has a built-in bias towards the perspective that sees each agency offering its own and separate opinion.

Finally, threat, decision time, and uncertainty have been viewed by a number of earlier analysts who have investigated crisis situations. Indeed, a major study

was conducted for the purpose of designing specifications for the World-Wide Military Command and Control System. These three variables are used to compare the agencies' images. Investigation of agency interpretations would be hard to generalize without a common baseline. The triad of perceptions, however, since they appear to be viewed as primary elements in defining international crisis would provide an excellent source for generalization.

The data investigated is the output phase of the Crisis Perception Model. The process of analyzing our simulation results emphasizes one of the most important characteristics of a computer simulation. A simulation must be able to provide information that is not apparent upon investigating singular components of the model. Analysis of the output provides us with two types of information. First, we are able to obtain a 'gestalt' of the crisis process. We will be able to see how international crises affect the bureaucratic milieu. Secondly, it may provide us with counter-intuitive findings. That is, when we combine and compare the output of the model, we may find that the results don't appear to follow naturally from certain assumptions. Working through the model transforms our assumptions and propositions into results which we could not have considered using less sophisticated methods.

C. Formulating a Research Design

The logic of the analysis presented below borrows heavily from some earlier research done in the social sciences. The analysis dealing with bureaucratic politics or the organizational consistency approach is based on Campbell and Fiske's "multi-method" analysis (*Psychological Bulletin*, 1959, pp. 81-105).

According to Campbell and Fiske any researcher must have both convergent and discriminate validity in any indicator system. Convergent validation is the confirmation of an indicator by independent procedures. (That is, if you have two indicators that are supposed to be measuring the same thing, they should correlate highly with each other.) Discriminate validation is the confirmation that different indicators measure different things. (Therefore, there is a low correlation between different indicators.)

This type of comparison is at the heart of the disagreement over whether agencies in the foreign policy community have similar or diverse perceptions of the outer environment. The Campbell and Fiske technique allows us to look at the hetro/homo-geneity of our indicators between agencies and across crises.

Campbell and Fiske argue that there is an easy way to look at these types of validity. Given a matrix of correlations between each and every indicator used in an analysis, distinct patterns of relations emerge. In our analysis this matrix of correlations deals with each of the agencies three perceptions. Figure 6.1 provides an example of such a matrix.

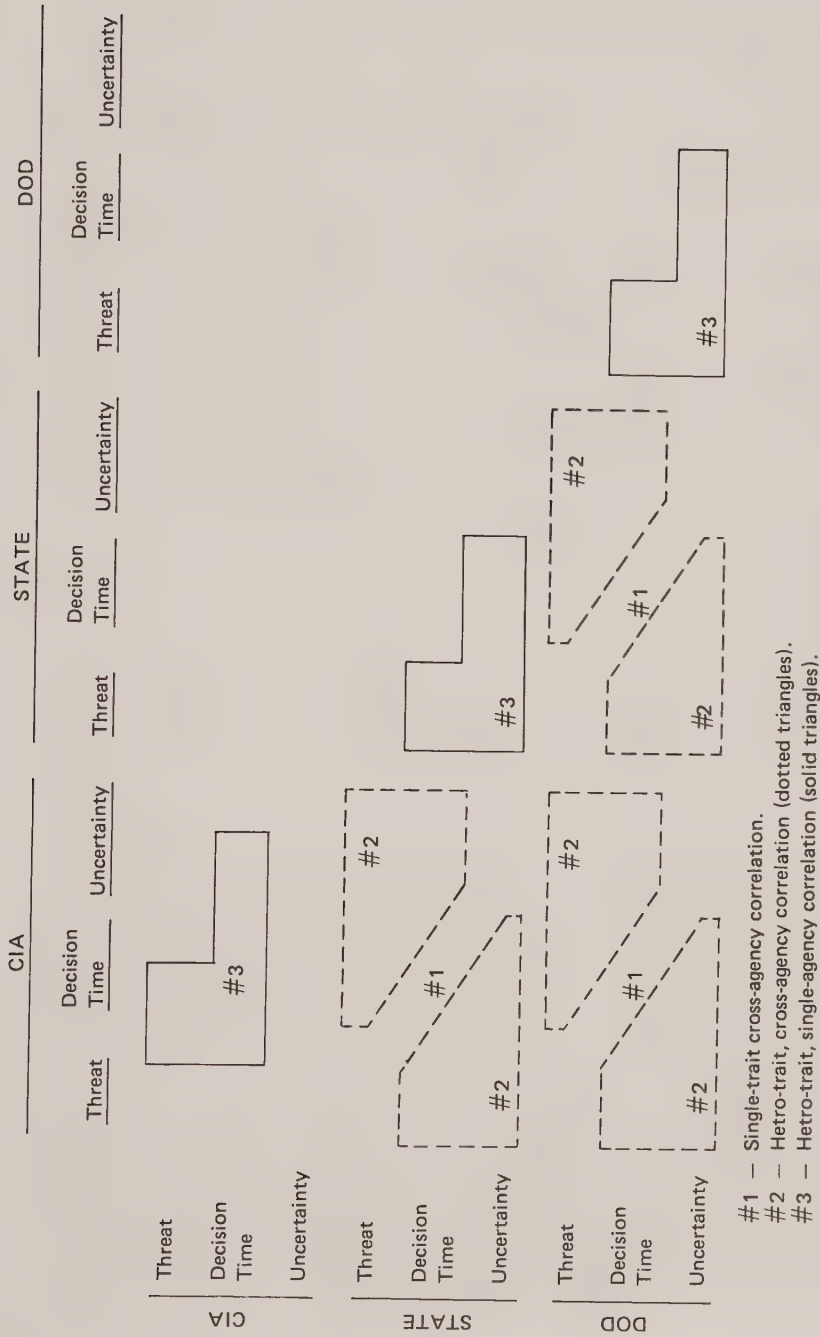


FIGURE 6.1
MULTI-AGENCY, MULTI-PERCEPTION MATRIX

The bottom half of the matrix can be divided into three distinct parts. Each of these parts will help make judgments about the homo/hetro-geneity of each of the perceptions.

1. The diagonal lines between the dotted triangles represent the validity diagonal (discriminant validity). These diagonals provide measures of the inter-agency correlations on the *same* type of perceptions.
2. Adjacent to each of the validity diagonals is the hetro-trait hetro-perception triangles. This triangle represents the relationships between different agencies on different perceptions.
3. The solid triangles represent the hetro-trait mono-perception triangles. In our case, these triangles provide us with the relationship for each of the variables within a single agency.

The decision to employ this type of technique in studying inter-agency perception is based on two rationales. First, this type of analysis does not require advanced understanding of statistics. Rather, the matrices provide an easy way "to eyeball" the kind of output the crisis perception model is producing. Second, and more importantly, the matrix provides some rather stringent guidelines in determining the degree of inter-agency hetro-geneity for each of the perceptions.

Some guidelines which could be employed using the matrices to judge the *hetro-geneity* of perceptions in crisis are:

1. The entries in the validity diagonal (inter-agency mono-perception correlations) should be close to 0.0.
2. The entries in the hetro-agency, hetro-perception triangles should also be close to zero.
3. The entries in the hetro-perception, mono-agency triangle may not necessarily be close to 1.0, but these correlations should be greater than those correlations found in criteria #2.

These three criteria provide rather stringent guidelines in determining the degree of interrelationship among the agencies. Criterion #1 indicates that there is a marked difference in the way each of the agencies view their outer environment. Criterion #2 suggests that there is no overlap of effects. It says that agencies are not linked in a secondary way, such as CIA uncertainty correlating with State Department threat. Finally, criterion #3 argues that an agency's perceptions are homogeneous and that within an agency each of the indicators affects one another.

It is apparent from this classification that there are two elements to the relationship between agency perceptions. First, agency perceptions correlate highly with each other. Second, there is no overlap or connection between agencies. As was discussed in the previous chapter, each of the three agencies receive the same stimulus from the outer environment. This is the coded data found on the indicator sheet. These indicators are filtered through each agencies'

weighting matrix [image] to provide us with agency perceptions. Since the perceptions come from the same stimulus we expect some inter-agency correlation between the perceptions. The differences in the correlations is related to the differences in each agency's image. Agency image plays an important role by attaching differing degrees of importance to various indicators for each agency. This weighting process combined with the different codings for each crisis yield a fairly dynamic model of crisis perceptions.

But this model is tempered in another way. Each of the measures of agency perceptions are defined by the same equations. While the different weighting matrices provide a dynamic element to the model, the use of the same equations provide a static element. Since these equations differ only in the weighting components part of the equation for each agency, relatively high correlations on the inter-agency, homo-perception diagonals are expected.¹ Further, it is not clear that the intra-agency perceptions will be highly correlated. This is because none of the measures of perception, except for decision time, are a function of one another. In the case of decision time, it is a function of the difference between the present and past uncertainty measures. But, this measure is altered by a decaying function.² Thus, the intra-agency perception will not necessarily be highly correlated.

Further, the structure of the matrices is such that the intra-agency hetro-perception triangles will be very similar to the inter-agency, hetro-perception triangles. Again, this is a result of the usage of the same equation (with different weighting components for each of the agencies.)

D. Results

The inter-agency, mono-perception diagonal

Most of the correlations between the agencies on this diagonal were relatively high (see technical appendix of this chapter for actual matrices). The correlations between the threat measures were consistently the high correlations. This is primarily a result of the coding process. Threat is defined as the sum of the negative scores of the subset of weighted indicators which define that interpretation. Threat for all interpretations and perceptions is highly dependent on those indicators which have been coded negatively. From these correlations an assumption of the perceptual model can be made explicit. Agencies will have the same sense of threat if their interpretation of the outer environment keep on the same indicators which have negative scores.

There are only a few crises which do not follow the expectation of high correlations between agencies on the perception of threat. These are Jordan

($r_{\text{ths.th}} = .47671$); N. Korea-US ($r_{\text{ths.th}} = .03463$). Both of these crises fell into the same categories in our preceding analysis on the rank order of agencies for maximum threat as well as uncertainty. In the threat typology, both crises fall into the category of Defense > State > CIA while in the uncertainty typology, they fall into the CIA > State > Defense category. Further, the low correlations occur in both cases between the State Department and the Defense Department on threat.

It is not apparent that the crises falling into the same categories for agency ranking helps explain the low correlations. A number of crises other than Jordan and N. Korea-US fell into these two categories, yet they do not have low correlations between the State and Defense Departments on threat.

Since there appears to be no apparent perceptual network which is causing this low correlation, we must drop back a step and investigate agency interpretations for these two crises. Given the low correlation we would expect the State Department and the Defense Department to key on different indicators. The simplest way to find this out using our model is to look at the interpretations which dominated each agency's image of these crises.

In the Jordan crisis the predominant interpretation employed by the State Department was "the territorial integrity of X violated." This interpretation heavily weighs indicators 10-12, 18, 19 and 26. The Defense Department interpretation vacillates between 'X is questioning our reserve to fight' and 'Y is in a position to attack X'. The first defense interpretation heavily weighs indicators 10-12 while the second interpretation heavily weighs indicators 18, 19, 24-26. From this comparison, we get a hint of the distinction between the two agency perceptions. State was continuously weighing six indicators heavily while Defense was only weighing three at any single time. While this only gives us a sketch of what is going on, it clearly shows the importance that the concept of image plays in the Crisis Perception Model.

The North Korean-US crisis is very similar to the Jordan crisis in that the two agencies are weighing different indicators. The Defense Department weighs indicator 15 as a result of employing the interpretation 'forces friendly to US being overrun.' State, on the other hand, is heavily weighing the same indicators as in the Jordan crisis: 10-12, 18, 19, 26. Since there is no overlap between the two sets of indicators, the perceptions between the two agencies are not highly related. Image combined with movement in the outer environment (which is reflected in the coding) have forced the two agencies to be threatened by different stimuli.

The inter-agency correlations for decision time follow the same pattern as the threat correlations. There is a high degree of agreement among the agencies except for two cases. One of these cases is the same as in the threat indicators — US-North Korean ($r_{\text{DS-DC}} = 0.10229$ and $r_{\text{DS-DD}} = .09988$). While the other

crisis is the India-Pakistan crisis ($r_{DS-DC} = .28416$ and $r_{DS-DD} = .34481$). Unlike the cases involving threat, there appears to be two different processes occurring since the correlations are in opposite directions. What is similar about these two crises is that both have low correlations between the State Department and the two other agencies.

The only typology of agency ranking in which both of these crises can be found in the same cell is the uncertainty typology. Both fall into the category where the CIA has the highest amount of uncertainty followed by the State Department and the Defense Department. Since uncertainty does play a part in describing decision time, this may have some importance in defining the low relationships. But again, the cell is filled with other crises which also show the same ranking among agencies but do not have low correlations. It seems safe to say from this second incidence that agency ranking has little or no affect on explaining deviant cases.

A tentative conclusion which might be drawn from this analysis is that an agency domination of some perceptual measure does not help explain the low inter-agency correlations on that same perception. In other words, a comparison of the rankings and the correlations indicates that it is unlikely that an agency's view would be so strong as to override another agency from having the same view. In the majority of cases, a dominant agency's perception is highly correlated with similar perceptions by other agencies. In those cases when there is low inter-agency correlation, the dominance of an agency does not seem to be the discriminating reason for the low relationship. The magnitude of a particular agencies' perception on similar indicators does not rule out the other agencies from having similar perceptions just smaller in magnitude.

The correlations on uncertainty do not follow such a unimodal pattern as the two earlier perceptions. For uncertainty, low correlations between agencies are the rule rather than the exception. In only ten crises do the correlations exceed .50 (see Table 6.1). Further, some of these crises with high correlation show negative relationships between some of the perceptions. Uncertainty acts very differently than the preceding two indicators.

Four of the crises show negative relationships between uncertainty. Two of these crises — Cuba and Turkey-US — show negative correlations between the CIA and both of the other agencies. Both of these crises deal with the kidnapping or destruction of US citizens or property. The protection of US nationals explain the negative relationships. Both the State Department and Defense Department will see a need to openly act in a situation of this type. Protection of nations is a highly observable operation. Further, the seizure of nationals or their property is a quick and unexpected type of crisis. It does not follow a long term trend such as those investigated in the works of Choucri and North (1975). Sporadic disruption might lower expectations since it fits into an overall scheme.

TABLE 6.1
LIST OF CRISES
ON INTER-AGENCY RELATIONSHIP FOR UNCERTAINTY

<i>Low Relationship*</i> <i>Between Agencies</i>		<i>High Relationship</i> <i>Between Agencies</i>
PLO-1	Cambodia	+ Cuba (CIA)
Saudi-PLO	Israel-Jordan 1	+ Cambodia 73-74 (Defense)
Korea	Lebanon-Israel	+ Turkey-US (CIA)
Arab-Israeli	Israel-UAR	+ Greece (State)
Mideast	Cyprus 74	Angola
Cyprus	Jordan	Israel-Jordan
Dom-Rep	North Korea-US	Rhodesia-Zambia
Sino-Soviet	India-Pakistan	Rhodesia
Portugal	Hong Kong	Jordan-Syria
Vietnam	Bangladesh	Uganda-Tanzania
Cambodia 74		
OPEC		
Laos		
Cambodia 75		

* Operationally defined as one of the three correlations between each agency $0 > r > .5$.
+ crises with some negative relationships (see text).

While at the same time, State and Defense will be surprised and unsure of what to expect from the other participants in the crisis.

The other crises which show high inter-agency agreement on uncertainty occurred either in the Mideast or on the African continent. While the importance of this geographical distribution may be minimal, it is the only obvious common characteristic of the crises. The reason that this geographical aspect should not be discounted is that 15 of the 36 crises occurred in this geographical locale. Since this locale predominates our sample, extreme caution should be employed in using the locale as an explanation.

Hetro-agency hetro-perception triangle

The relationships between each of the agencies on different perceptions must be examined. This type of investigation is one way to discern the degree of conflict

between each of the agencies. A priori one would expect low correlations between the agencies on different perceptions. Yet, the results provided by the model are more complex. First there does appear to be some relationships between the agencies on different indicators. This is primarily a function of the weighting schemes for each agency filtering the same data.

While the same stimuli plays an important role in the correlations between these perceptions, the weighting matrices themselves are of primary importance. This is the case, since high correlations between the agencies in all crisis situations were not found. Rather, high correlations occur on those crises in which there is a high degree of interaction between the agency interpretations.

For example, in a number of crises (see Appendix) there is a high correlation between the Defense uncertainty perception and the other two agencies threat perceptions. Recalling the operational definitions of these two measures, it is not difficult to see how the relationship has come about. Those indicators with the highest weightings for the Defense Department are the same indicators which received negative scores. This also explains the high correlations between the Defense Department perceptions of threat and uncertainty discussed in the earlier section.

In only one instance does a high correlation appear with two perceptual variables in which uncertainty is not involved. In the Mid-East crisis there is a pattern of high negative correlations between decision time and threat for all of the dyadic relationships between agencies. Decision time is linked to the uncertainty perception. Again, it appears that indicators with the highest weightings for each of the agencies are the same indicators which consistently have negative scores.

Thus, in the cases under study here any linkage between perceptions that have occurred has come through those indicators which show a negative value. A tentative conclusion which might be drawn from this is that some linkage occurs in situations where "bad things" are beginning to happen. Thus, when the situation takes a turn for the worse, there is a tendency for the three agencies to coalesce in their interpretations. This has several implications. A President can expect large differences of opinion between agencies when crises are not so dangerous and vice versa. These findings contain a warning: Watch carefully for divergencies during periods of intense crises. While he must identify the reasons for divergences during these periods quickly, a President may rarely see such divergencies when he most needs them.

Hetro-trait mono-agency triangle

In most of the crises the CIA triangle shows one high correlation between threat and uncertainty. In two cases a high negative correlation occurs between

decision time and uncertainty (Cyprus and Greece). In the Angolian and Middle-East crisis, there is a high negative correlation between threat and decision time. In a few crises, such as the Arab-Israeli crisis; Cambodia (75); India-Pakistan; and OPEC, there are extremely low correlations between all three perceptions.

A similar pattern occurs in the State Department. In most crises, there is a high correlation between uncertainty and threat. In two crises, this high correlation is combined with a high correlation between decision time and threat (Dominican Republic and the Mid-East). In the Portuguese crisis the only high relationship is found between uncertainty and decision time. In a number of crises there are low correlations between the perceptions. These crises are: Jordan, Laos, Vietnam, and the Arab-Israeli.

This pattern also holds for the Department of Defense. A clear majority of crises show a high relationship between threat and uncertainty. The Mid-East and Bangladesh crises also show a high negative correlation between threat and decision time added to this pattern. In a number of crises involving kidnap attempts or assault on US citizens, there is a high negative correlation between uncertainty and threat (North Korea-US and the Dominican Republic). Two other crises show a high positive relationship between these two perceptions (Korea and Lebanon-Israel). Low correlations occur in three crises: India-Pakistan, Israel-UAR; and Turkey-US. Cyprus and Vietnam show a high correlation between decision time and threat.

No single characteristic of a crisis distinguishes itself as a deviant case. Only two crises — Arab-Israeli and India-Pakistan — receive low mono-agency correlations in two different agencies. Both of these crises can be described as border clashes. But one of the crises, the Arab-Israeli, receives low correlations for the CIA and the State, while the other, India-Pakistan, receives the low correlations in the CIA and Defense Department. Perhaps the differences between the two is found in US military preparedness for the Middle-Eastern crisis while a lack of military preparedness exists in the Asian situation.

What does seem to occur in all the crises with low correlations is that they all reflect the military dimension of a crisis. Only in OPEC are troops not involved in the situation. All of the other crises can be described as military rather than diplomatic or economic crises.

E. Conclusions

From our analysis important conclusions about the crisis perception model can be drawn. First, the results reinforce the idea that it is the combination of changes in the external environment along with an agency's image that drives the model. This is seen in the different patterns of relationships which have emerged

over the set of crises. The lack of agency images would have forced us into a chartist position with no clear patterns emerging. A model with an over-emphasis on image would have left us with no variance across the set of crises.

Even with this mix of external stimuli and image weighting some points about agency interactions appear to be in order. Threat appears to be the most agreed upon perception between agencies. The importance of this can not be understated. As noted in a previous chapter, threat has lacked an important place in the theoretical perspective on conflict. This result indicates two things. First, it is an important element in international crises using a perceptual perspective. Second, the basis for seeing threat differs from agency to agency.

The fact that high correlations do not occur on uncertainty also has important implications for the behavioral transformations. It seems to indicate that the agencies may not perceive a crisis at similar times. It also indicates that new information has very different effects on each of the agencies. A stimuli may force one agency's distribution of interpretations into a uni-modal form while at the same time forcing another agency's distribution into a multi-model perspective.

Finally, an important implicit assumption brought out in this analysis is the linkage between the uncertainty and threat measures. While this has some important implications for the catastrophe model (in particular, it seems to indicate that there is a movement in the direction hypothesized³), it has others as well. It suggests that the images described in our research are predominantly weighted toward bad things (negative scores) happening.⁴ The images may be applicable to crisis situations (especially using a post-hoc perspective) but not the larger every day transactions that occur on an everyday basis. This, however, is only a hunch, since we have not in this analysis attempted to compare crisis situations with non-crisis situations.

Still, it seems important that the conceptualization underlying the model seems to point to this linkage between uncertainty and threat. It seems almost commonsensical that when we are not sure of a situation we will feel anxiety and threatened. The model indicates that this threatening feeling might occur in two ways. First, if a particular agency is uncertain about its interpretation of the unfolding events (mono-agency interperception triangles), it may begin to feel threatened. Second, a reinforcement effect also occurs in the model. When another agency is also uncertain about its outer environment, it may stimulate the first agency's perceptions of threat.

From this we can conclude that a link exists between the perceptions of each of the agencies. This linkage is primarily a reinforcement process which occurs as a result of the mix of interpretations which each of the agencies have in their image structure.

Notes

1. This point will be substantiated and refined below.
2. See p. 74.
3. This leads to some assumptions about the perceptual field, which is investigated below. In particular, that the two measures are not transformed in the analysis using the catastrophe model.
4. That is, the more negative scores coded the more interpretations come into importance, the greater the degree of uncertainty.

Appendix
Multi-Agency, Multi-Perception Matrix

CIA			STATE			DOD		
	Threat	Decision Time	Uncertainty	Threat	Decision Time	Uncertainty	Threat	Decision Time
Threat								
Decision Time	.14028							
Uncertainty	-.19814	-.16759						
Threat	.96798	.04955	-.06763					
Decision Time	.11006	.82372	-.33794	.00550				
Uncertainty	-.51605	-.29031	.73648	-.33207	-.39506			
Threat	.95927	.08277	-.06208	.96751	.02432	-.35537		
Decision Time	.03985	.77873	-.72111	-.04526	.78203	-.27646	-.01822	
Uncertainty	.82465	-.03829	.23078	.90116	-.15103	-.04032	.91304	-.13944

ARAB-ISRAELI

CIA			STATE			DOD		
Threat	Decision Time		Threat	Decision Time		Threat	Decision Time	
	Threat	Uncertainty		Threat	Uncertainty		Threat	Uncertainty
Threat								
Decision Time	-.0266							
Uncertainty	.1038	.0651						
Threat	.8924	-.0673	-.3137					
Decision Time	.0133	.8544	.0665	-.0421				
Uncertainty	.2628	.2055	-.4781	.5260	.0649			
Threat	.7676	.0390	-.5013	.9457	-.0168	.5713		
Decision Time	-.0015	.9238	.0338	-.0331	.8939	.1613		
Uncertainty	.4760	-.2145	-.2785	.6842	-.2796	.5698	-.0077	.6062

CAMBODIA

CIA			STATE			DOD		
	<u>Threat</u>	<u>Decision Time</u>	<u>Threat</u>	<u>Decision Time</u>	<u>Uncertainty</u>	<u>Threat</u>	<u>Decision Time</u>	<u>Uncertainty</u>
Threat								
Decision Time	.04657							
Uncertainty	.28756	.28867						
Threat	.81664	-.09808	.13365					
Decision Time	.12171	.91217	.75219	.01793				
Uncertainty	.55529	.27101	.38831	.54144	.27207			
Threat	.69966	.00814	.33209	.90512	.10069	.74692		
Decision Time	.26786	.91217	.21031	.24401	.80888	.34431	.29076	
Uncertainty	.45245	.08773	.12546	.65978	.13591	.89059	.84950	.27582

CAMBODIA 5

CIA			STATE			DOD		
	<u>Threat</u>	<u>Decision Time</u>	<u>Threat</u>	<u>Decision Time</u>	<u>Uncertainty</u>	<u>Threat</u>	<u>Decision Time</u>	<u>Uncertainty</u>
Threat								
Decision Time	.02704							
Uncertainty	-.85283	.25035						
Threat	.99209	-.00604	-.05753	.94005	.03641			
Decision Time	-.00896	.86968	.29920					
Uncertainty	.94168	.14577	-.74386					
Threat	.98881	-.04461	-.91930	.99659	.07957	.91020		
Decision Time	-.00925	.84818	.30038	-.05883	.99734	.03047	-.07948	
Uncertainty	.96015	.12017	-.82841	.97157	.03381	.98193	.94975	.02950

CUBA

CIA			STATE			DOD		
Threat	Decision Time	Uncertainty	Threat	Decision Time	Uncertainty	Threat	Decision Time	Uncertainty
	.38813							
Decision Time		.75583						
Uncertainty								
Threat	.87775	.56569	.89176	.44010	.05959			
Decision Time	.38285	.99788	.55531					
Uncertainty	.04919	.14154	.46388	.14174				
Threat	.99695	.44723	.89176	.44010	.05959			
Decision Time	.35223	.98481	.51010	.98572	.12391			
Uncertainty	.27191	.63157	.23889	.62563	.40851			

DOMINICAN-REPUBLIC

CIA			STATE			DOD		
	<u>Threat</u>	<u>Decision Time</u>		<u>Threat</u>	<u>Decision Time</u>		<u>Threat</u>	<u>Decision Time</u>
Threat								
Decision Time	.14513							
Uncertainty	-.16929	.15141						
Threat	.82803	.15305						
Decision Time	.19291	.28416						
Uncertainty	-.51805	-.04504						
Threat	.77382	.13643						
Decision Time	.06730	.88085						
Uncertainty	-.08625	.13684						

STATE

DOD

INDIA-PAKISTAN

CIA			STATE			DOD		
	Threat	Decision Time	Uncertainty		Threat	Decision Time	Uncertainty	
Threat								
Decision Time	.06280							
Uncertainty	.92991	-.03240						
Threat	.81506	.03711	.69852					
Decision Time	.05884	.74757	.02214					
Uncertainty	.54044	-.02850	.51088					
Threat	.75720	.04946	.63396					
Decision Time	.04967	.72623	.01995					
Uncertainty	.01716	.08616	.03260					

STATE

DOD

ISRAEL-JORDAN 1

CIA			STATE			DOD		
Threat	Decision Time		Threat	Decision Time		Threat	Decision Time	
	Threat	Uncertainty		Threat	Uncertainty		Threat	Uncertainty
Threat								
Decision Time	-.13615							
Uncertainty	.41367	.19230						
Threat	.93994							
Decision Time	-.01424	.69758						
Uncertainty	.78354	.00146						
Threat								
Decision Time								
Uncertainty								
Threat	.98183							
Decision Time	-.09092	.84187						
Uncertainty	.07506	.12274						

STATE

DOD

ISRAEL-UNITED ARAB REPUBLIC

Threat	Decision Time	Uncertainty
-12254	.57387	.07248

Threat	Decision Time	Uncertainty
.78068	-.31699	.12760
-.01013	.83348	.05297
.48362	.00746	.37028

Threat	Decision Time	Uncertainty
.51870	-.13338	.31129
-.11358	.75538	.08842
.47510	-.14001	.41800

Threat	Decision Time	Uncertainty
.47671	.01868	.81711
-.30954	.79777	-.00575
.47344	-.00809	.79687

Threat	Decision Time	Uncertainty
-15420	.39863	.18412

Threat	Decision Time	Uncertainty
-14069	.71990	-.15241

JORDAN

	CIA			STATE			DOD		
	<u>Threat</u>	<u>Decision Time</u>	<u>Uncertainty</u>	<u>Threat</u>	<u>Decision Time</u>	<u>Uncertainty</u>	<u>Threat</u>	<u>Decision Time</u>	<u>Uncertainty</u>
Threat									
Decision Time	.05652								
Uncertainty	.68685	-1.6072							
Threat	.87381	-.05643	.71982						
Decision Time	.05632	.68989	-.04221	.04628					
Uncertainty	.54684	-.18544	.90015	.69051	-.08880				
Threat	.92687	-.03815	.83312	.87010	-.01200	.71801			
Decision Time	-.06344	.77857	-.13724	-.06524	.68989	-.18544			
Uncertainty	.74215	-.07661	.88323	.68289	-.01955	.72560	-.12242		
							.89694	-.09547	

JORDAN-SYRIA

CIA			STATE		DOD	
	<u>Threat</u>	<u>Decision Time</u>	<u>Threat</u>	<u>Decision Time</u>	<u>Threat</u>	<u>Decision Time</u>
Threat						
Decision Time	-.59698					
Uncertainty	.38034	-.07565				
Threat	.99206	-.60522				
Decision Time	-.59441	.75904	-.64202			
Uncertainty	.86068	-.48149	.85017	-.47194		
Threat	.95006	-.60697	.96801	.70640		
Decision Time	-.67167	.66133	-.69121	.77825	-.82038	
Uncertainty	-.32918	.33824	-.35791	.42179	-.46430	.49490
MIDEAST						
Threat						
Decision Time						
Uncertainty						

CIA			STATE			DOD		

CIA			STATE			DOD		
	<u>Threat</u>	<u>Decision Time</u>	<u>Threat</u>	<u>Decision Time</u>	<u>Uncertainty</u>	<u>Threat</u>	<u>Decision Time</u>	<u>Uncertainty</u>
Threat								
Decision Time	.14877							
Uncertainty	.79615	.17551						
Threat	.95342	.11433	.71580					
Decision Time	.09033	.81789	.14775	.05001				
Uncertainty	.65828	.27017	.82030	.70586	.18617			
Threat	.95841	.12627	.77652	.98088	.04055	.71181		
Decision Time	.09337	.85743	.10028	.06876	.88869	.15849	.05318	
Uncertainty	.72602	.19748	.94596	.64187	.15063	.69856	.73999	.13877

RHODESIA

CIA			STATE			DOD		
	Threat	Decision Time	Threat	Decision Time	Uncertainty	Threat	Decision Time	Uncertainty
Threat								
Decision Time	-10167							
Uncertainty	.89411	.05286						
Threat	.96497	-17936	.84546					
Decision Time	-14556	.86679	-01085					
Uncertainty	-55221	.10418	-68967					
Threat	.85993	-23583	.55560					
Decision Time	-17409	.81402	-03354					
Uncertainty	-11455	-.31346	-.53513					

TURKEY-US

CIA			STATE		DOD	
	<u>Threat</u>	<u>Decision Time</u>	<u>Threat</u>	<u>Decision Time</u>	<u>Threat</u>	<u>Decision Time</u>
Threat	.1130					
Decision Time	-.6037	.0282				
Uncertainty						
Threat	.9480	.2881	.2935			
Decision Time	.0861	.9128		.0497		
Uncertainty	-.1151	.0435	.0497	.0742		
Threat	.9915	.1507	.9556	.1059		
Decision Time	.0570	.9351	.2128	.8925	.0853	
Uncertainty	.8242	-.1090	.725	-.0994	.7544	-.1076

SINO-SOVIET

	CIA			STATE			DOD		
	Threat	Decision Time	Uncertainty	Threat	Decision Time	Uncertainty	Threat	Decision Time	Uncertainty
CIA	Threat								
		.23295							
	Decision Time								
		.84514	.15368						
	Uncertainty								
STATE	Threat								
		.81881	.07564 .75605						
	Decision Time								
		.36369	.84929 .30798						
	Uncertainty								
		.43336	.01162 .65613						
DOD	Threat								
		.92222	.13045 .58362						
	Decision Time								
		.22166	.89988 .13062						
	Uncertainty								
		.62383	.05284 .95505						

UGANDA-TANZANIA

CIA			STATE			DOD		
Threat	Decision Time	Uncertainty	Threat	Decision Time	Uncertainty	Threat	Decision Time	Uncertainty
	.38590							
Decision Time								
Uncertainty	.49712	-.11330						
Threat	.98100							
Decision Time	.29017	.91291	.34297					
Uncertainty	.31329	.39816	.29817	.34776				
Threat	.97710		.99051	.36369	.39702			
Decision Time	.38044	.80311	.41077	.80468	.38802	.42641		
Uncertainty	.25787	.02958	.39205	.09312	-.33264	.33122	.04988	

FALL OF VIETNAM

Chapter VII

The Concept of Crisis in International Politics¹

A. The Concept of Crisis

While the importance of crises in the international system is well understood, a clear understanding of what causes situations to be seen as crises has so far alluded students of the subject. One possible reason for this conceptual inadequacy is the lack of analytic frameworks in which to place the concept. To a large extent, the explanation for this absence of theory rests with the confusion surrounding the use of the term. In its ordinary use, crisis has been equated with an important volatile situation, one which is violent or potentially violent. It has been used to refer to the period preceding war even if war is ultimately averted. The tendency has been to extend its meaning to include a wide range of situations. As a result, it has become difficult to operationally distinguish crisis from non-crisis periods. This tendency has not been conducive to the production of systematic knowledge about international relations and it appears to represent a difficulty which is common to both the scholar and the practitioner.

Two approaches to a more systematic definition of crisis can be found in the literature; the substantive and the procedural approaches.² With the first or substantive approach, the concept of crisis is understood as something which is specific to the content of a particular problem or situation. Those using this definition have been concerned primarily with the implications of a particular policy, problem, or situation (Kahn, 1965; Triska, 1964; McClelland, et al., 1965; Bloomfield and Beattie, 1971). On the other hand, those students of crisis, whose aims are general theory, tend to use a more procedural definition of crisis (Weiner and Kahn, 1962; North, *et al.*, 1968; Robinson, 1962; Hermann, 1969). These definitions focus on those characteristics generic to any crisis situation without regard to the subject or the substance of the crisis.

The theoretical explanations of the latter group can be divided into two areas: 1) those who utilize a decision-making approach which deals primarily with intra-unit situations and processes, and 2) those who prefer to investigate inter-unit exchanges. Specifically, the decision-making approach theorists have dealt with policy processes, perceptions, intentions, public opinion, and the

psychological management (M. Hermann, 1965; Paige, 1968; Robinson, 1962; Snyder, Bruck and Sapin, 1962; Holsti, 1972). In contrast to this approach, the systemic approach focuses on the exchange of actions and reactions by crisis participants. The number and types of foreign policy outputs which a nation produces is thus examined according to the volume of acts per time span, the distribution of actions across a set of types, and the sequencing of acts (McClelland, 1965 and 1968; Sullivan, 1964).

Yet neither approach has been able to explain the differences in actions chosen by decision makers in apparently similar situations. For example, why did the United States intervene on behalf of the crew of the *Mayaguez*, but not on behalf of the crew of the *Pueblo*? Dealing with each of the crises as a case study might provide us with information on the reasons for different responses by the system. It could help to identify the contexts in which each decision was taken. Unfortunately, using a case study perspective generally means losing the underpinnings of a more general framework which allows for the comparison of event streams from differing crises.

Most substantive writers on crises agree that there are some intriguing forms of behavior noticed when the national security bureaucracy shifts from a routine to a crisis mode of operation. One inherent characteristic of this shift is that the behavior appears bimodal over part of its range. Sudden changes are observed from one mode of behavior to another; from the pre-crisis standard operating procedures to the particular form of crisis response chosen for each particular crisis. This pattern of sudden change is very difficult to forecast: small perturbations in the exterior state of world affairs, in accordance with the systems school approach, occasionally create large differences in the behavior exhibited on the part of the actor. These special situations are not amenable to the normal statistical descriptive procedures developed by the systems theorist to "explain" or understand the shifts. Standard statistical procedures are not adequate for describing such bimodality, sudden transitioning, and divergence.

B. The Introduction of Catastrophe Theory

It is our contention from chapters II and IV that a crisis in international relations is operationally defined as a discontinuity or jump in behavior. To capture this discontinuity one needs to identify variables which indeed show shifts in behavior at the outset of a crisis. Both military behavior and emergency operating procedures shift noticeably at the outset of a crisis. If we accept McClelland's definition of crisis: "A crisis is, in some way, a change of state in the flow of international political actions;" (1968, p. 160), we will be able to employ a very powerful model for describing crisis behavior.

The dimension of crisis behavior that we are interested in studying is military action. The behavior lies on a continuum which goes from complete passivism on the low end to nuclear attack on the high end. Military operations against some entity begin at the zero point on the continuum and build to nuclear war at the high end. The continuum is presented in Chapter II.

Thom (1968) notes in his earliest article on catastrophe theory that all changes that occur within the system under study rely on variables within the system itself. All *change* in this model is created from the inner environment of the system rather than from any direct external stimuli. Keeping within this restriction the two control variables in this example will be *perceived* decision time and *perceived* threat. Obviously the perceptions are a function of the outer environment, but not necessarily a one-to-one mapping.³

The control variables are taken from Hermann's analysis of crisis situations. Hermann (1969) rearranged an earlier crisis typology or scheme by Robinson (1962) to include three dimensions: surprise (the amount of prior awareness of the situation), the decision time available to the decision maker (short, intermediate, or long), and the threat present as perceived by the decision maker (high or low). This typology was designed for the situational analysis of actions (Hermann, 1969, p. 415). It is important to note that explaining crises in terms of catastrophe theory treats behavior as a function of the situation. For Hermann it is the decision maker's perception of events in terms of each of the three dimensions — surprise, threat, and decision time that distinguish the crisis situation from the non-crisis situation. Hermann represents these three dimensions in a crisis cube (Figure 3.1).

For Hermann one of the eight points in the crisis cube depicts a crisis situation. The crisis situation is described when there is a high threat, short decision time, and surprise. This allows for easy delineation of a crisis situation from a non-crisis situation. If one of the three characteristics of the Hermann definition is missing, a crisis situation does not exist.

Hermann argues that the position defined as a crisis in his cube should be viewed as an ideal point. In reality crisis situations do not actually lie in the corner of the cube designated as crisis. Rather empirical situations lie close to this point.

In our example of crisis defined by the cusp model, we will use two independent variables. Since the independent variables are situational variables, we will employ decision time and threat in the cusp model.

The decision time continuum measures the relative amount of time available for choosing alternative behaviors. A zero point on the continuum represents normalcy. Normalcy is a measure of the average decision time using everyday standard operating procedures. On the low end decision time is a matter of minutes (or seconds) such as reacting to a signal that a nuclear attack has begun.

On the high end of the continuum actions need not be taken for several days or weeks.

The continuum for perceived threat will go from US strategic dominance on the *low* end to US strategic impotence on the *high* end. It should be remembered that this is perceived threat.

Assume that these concepts have been fully conceptualized and operationalized. What are their relationships to each other? This is an important aspect of Thom's model and the point at which it can make a powerful contribution. Each relationship can be viewed as a "slice" of the three-dimensional graph found in Figure 7.1.

C. The Cusp Model of Crisis

The simplest model, the cusp model, is a three-dimensional model which consists of two independent variables affecting a single dependent variable. The relationship between each of the variables is synthesized onto a single three-dimensional graph. One of the real assets of Thom's model is that it looks at the interaction between relationships as well as between variables.

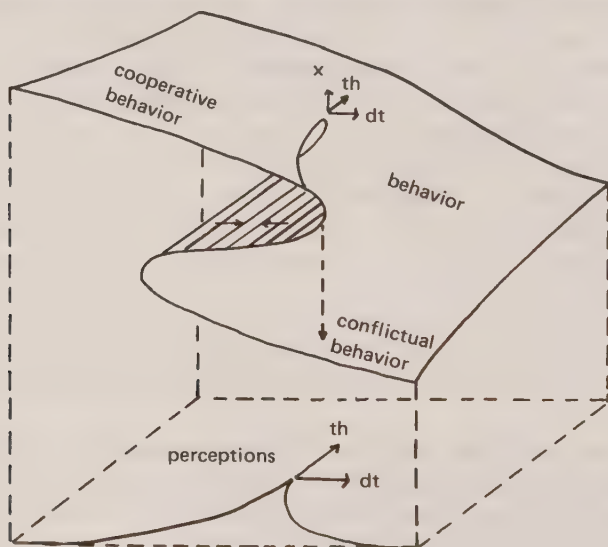


FIGURE 7.1

THE CUSP CATASTROPHE DEPICTING INTERNATIONAL CRISIS

The cusp model's behavior and control space is defined by the function:

$$f(dt, th, x) = 1/4 X^4 - 1/2 dt X^2 + th X \quad (1)$$

In terms of the behavior space:

$$R^2 \times R^1 \rightarrow R^3$$

The coordinate system R is a three-dimensional system consisting of a control space composed of two independent variables (dt and th) and a behavior space composed of a single dependent variable (X).

Since we are concerned with crisis behavior we must look at that surface of the control and behavior space that corresponds only to behavior. This surface is defined by finding that partial derivative of f for x (the behavior variable) and setting that derivative equal to zero:

$$\frac{\partial f}{\partial x} = x^3 + dt x + th = 0 \quad (2)$$

Plotting this derivative over a large number of values for each of the variables, the three-dimensional surface shown in Figure 8.1 of Chapter VIII is obtained.

The most important aspect of this behavior surface is the fold found on it. This fold defines the sudden transition in behavior. Recall that it is sudden transitions in behavior that are characteristic of crises. The question expressed in catastrophe theory terms, becomes when does behavior stay on the bottom and top surfaces of the fold. Since we are dealing with a single dimension of behavior, the behavior must be on either the top or bottom surfaces.

To solve this problem we must determine the critical points on the behavior surface. This is done with the help of the second partial derivative of f for x :

$$\frac{\partial^2 f}{\partial x^2} = 3x^2 + dt \quad (3)$$

Since it is necessary to determine the critical points *on* the behavior surface, the use of a LaGrange multiplier yields:

$$x^3 + dt x + th + \lambda (3x^2 + dt) = 0 \quad (4)$$

Taking the partial derivative for each variable in equation 4 we can determine the critical points:

$$(dt, th, x) = (-3x^2, 2x^3, x).$$

When behavior is in the fold area, it will be stable until it reaches a critical point. When it reaches the critical point it will *change* to the other surface of the fold.

To determine the fold area on the control space, eliminate the behavior variable from equation (2):

$$x^3 + thx + dt = 0$$

$$\frac{\partial f}{\partial x} = 3x^2 + th = 0$$

$$\therefore (\sqrt{\frac{th}{-3}})^3 + th(\sqrt{\frac{th}{-3}}) + dt = 0$$

simplifying

$$\frac{th}{-3} (\sqrt{\frac{th}{-3}}) + th(\sqrt{\frac{th}{-3}}) + dt = 0$$

multiplying by -3

$$th(\sqrt{\frac{th}{-3}}) - 3th(\sqrt{\frac{th}{-3}}) - 3dt = 0$$

simplifying

$$-2th(\sqrt{\frac{th}{-3}}) - 3dt = 0$$

or

$$-2th(\sqrt{\frac{th}{-3}}) = 3dt$$

squaring both sides of the equation

$$4th^2 (\frac{th}{-3}) = 9dt^2$$

multiplying by -3

$$4th^2 (th) = -27dt^2$$

or

$$4th^3 + 27dt^2 = 0$$

$$4dt^3 + 27th^2 \leq 0$$

(5)

The equation is less than or equal to zero because we are concerned with all of the area within the fold. But, these relationships can be most readily interpreted in the control space of decision time and threat. Figure 7.2 lays out the control space and the crisis fold area of that space. Values of decision time and threat inside the inverted V at the bottom of the space in Figure 7.2 are within the fold area. It is in this area that images of the environment are under pressure from two forces. One force pushes toward normal solutions to the problem;



FIGURE 7.2

CONTROL SURFACE OF CUSP CATASTROPHE

the other toward crisis behavior. When national perceptions of decision time and threat cross both lines of the inverted V from left to right, a shift in behavior occurs.

If we expand our graphic understanding of the model and treat behavior as a hypothesized function of threat and/or decision time as specified in the equations, certain conclusions about crisis can be derived. By treating relationships as hypotheses we are emphasizing the fact that we are dealing with qualitative statements rather than proven facts.

H1: When decision time is normal and threat increases, military behavior is likely to increase. This hypothesis states a positive relationship between threat and military behavior *when decision time is normal*. It is easy to define this relationship in mathematical terms as well as in terms of the above coordinate system. (Figure 7.3).

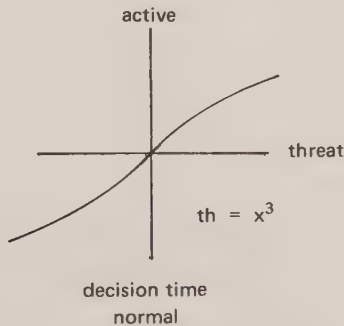


FIGURE 7.3

H2: When decision time is short, military behavior is still positively related to threat. But a minima and maxima form on the curve.

It is assumed that short decision time implies that it equals some negative number (relatively defined this means that as the number becomes smaller the distance between the maxima and minima increases). Like the earlier hypothesis, this relationship can also be defined in mathematical terms (Figure 7.4).

H3: When decision time is long, military behavior is still positively related to threat, but the relationship has a larger slope than when decision time does not enter the equation. (Figure 7.5)

If we fold these slices back together we develop the figure seen in Figure 7.2.

Each of these hypotheses or "slices" provides an important clue about the three-dimensional relationship involved in the description of crisis behavior.

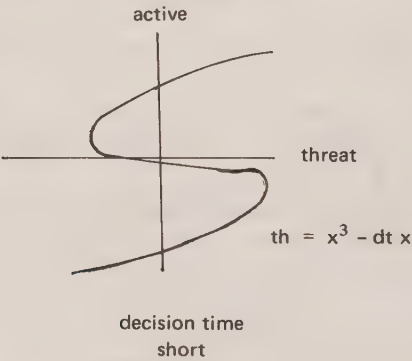


FIGURE 7.4

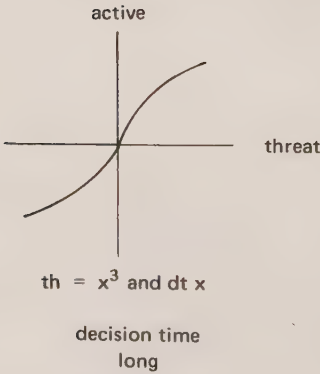


FIGURE 7.5

First, we learn that a fold does not occur on the behavior surface until decision time is less than normal (zero). This is important since it indicates that when nations perceive that they are not forced to act quickly, their behavior patterns are quite stable. Using this model, a crisis can not occur unless decision time is short. Clearly, this corresponds closely to the earlier Hermann definition of crisis situations in respect to the decision time variable. Threat, however, is allowed to take any value and a crisis or a shift in behavior is possible. This is in contrast with the call for high threat on the part of Hermann's crisis definition. On the other hand, the catastrophe definition of crises appears similar to what are defined as crises or emergency situations in the National Security bureaucracy for most countries.

Figure 7.3 also provides another important aspect of the model. A jump from the lower behavior surface to the upper behavior surface will be in a different place than a jump from the upper behavior surface to the lower behavior surface in the model.⁴ An example of this relationship using some hypothetical values will help explain this aspect of the model (Table 7.1).

At t_a of Table 7.1 the system seeks the unique minimum -2. As one moves from t_a to t_e a second minima is developing. It is only at t_f , when the first local minima disappears that behavior takes the catastrophic jump to +1.

TABLE 7.1
MINIMA OF SYSTEM

t_n : (dt, th, approximate local minima of x)		
t_a (-3,-2,-2)		(-3,-3,-2)
t_b (-3,-2,-2)		(-3,-2,-2) ★★★ B
t_c (-3,-1,-2)		(-3,-1, 1)
t_d (-3, 0,-2)		(-3, 0, 1)
t_e (-3, 1,-2)		(-3, 1, 1)
t_f (-3, 2, 1) ★★★ A		(-3, 2, 1)
t_g (-3, 3, 1)		(-3, 3, 1)

If one goes in the opposite direction t_g to t_a (this is the same as saying the system is in a higher state of military activity) the system stays in the local minima +1 until t_b .

Translating this relationship into the crisis behavior mode; when the system is not already involved in military action, it will not chose military action until

threat is extremely high (only empirical operationalization can solve the actual range problem). If the system is already involved in military action, it will not cease this action until threat is reduced to -2. This has important implications for the understanding of crisis behavior. It gives credence to earlier works that have argued that the jump from a non-crisis system to a crisis system is distinct from the jump from a crisis system to a non-crisis system (McClelland, 1968; Phillips and Lorimor, 1972). This divergence in moving from the top surface to the bottom and from the bottom surface to the top becomes larger as decision time becomes shorter.

National security bureaucracies are reluctant to shift from normal operating procedures to a crisis mode of operation as it severely disrupts normal routines. Once a crisis has been initiated and fighting has broken out, however, there is an equally strong resistance to cessation of conflict. If these deductions hold true empirically, as we fear they do, the cessation of conflict must overcome bureaucratic inertia against such activity. While these arguments will have to be studied empirically, they suggest important consequences for crisis operations planning and demonstrate the potential of catastrophe theory.

D. The Elliptic Umbilic Extension

The cusp model provides an elementary understanding of the application of catastrophe theory to the concept of crisis, but it does not provide a full conceptualization of crises. We shall need to look at the catastrophe model that Thom describes as the elliptic umbilic as a potential model for developing a typology of crises.

The elliptic umbilic consists of three control variables affecting two behavior variables. Thom feels it can be spatially interpreted as analogous to a hair, spike, or a needle. The elliptic umbilic can be temporarily interpreted in terms of drilling or filling (Thom, 1969, p. 320). These interpretations make sense in terms of crisis and crisis management. The most obvious example is the idea that a crisis is a stop gap measure created by a degree of threat. That is, the decision making system must fill the hole in their defense and put a quick end to threat. Thom has argued that these intuitive ideas should provide the insight necessary to conceptualize the social situation in terms of the elliptic umbilic.⁵

If we accept Thom's assertion then it becomes necessary to investigate the properties of the elliptic umbilic model in the same way we did for the above cusp model. The function which describes the *elliptic umbilic* is:

$$f(a,b,c,x,y) = x^3 - 3xy^2 + c(x^2 + y^2) - ax - by \quad (6)$$

To determine the behavior surface of the model, it is necessary to set the partial derivatives of f on both x and y equal to zero.

$$\frac{\partial f}{\partial x} = 3x^2 - 3y^2 + 2cx - a = 0 \quad (7)$$

$$\frac{\partial f}{\partial y} = 6xy + 2cy - b = 0 \quad (8)$$

As explained previously the crisis milieu is defined in terms of the following variables: threat (th), decision time (dt), uncertainty (un), military behavior (x) and operating procedures (y). Plotting the critical points of decision time, threat, and uncertainty provides us with a bifurcation set in the three control dimensions (Figure 7.6). To transgress into this subspace is to create a potential crisis. To move out of this area is to create a shift in behavior space — a crisis. The bifurcation set can be thought of as equivalent to the corner of the situation cube Hermann has designated as a crisis situation. This is, however, only an analogy. There are important changes using the bifurcation set as a definition of crisis situation. First, crisis situations in the catastrophe models have variability. If the situation variables vary from normalcy, there is a higher likelihood that the system will be placed in a crisis situation. The probability of a crisis situation is increased markedly moving in either direction from normalcy on the threat continuum.⁶ This movement is to the left or right of the point in the center of Figure 7.7.

The model distinguishes between a crisis and a crisis situation. A crisis is defined as an instantaneous change in behavior. The crisis situation places the system in a state of "alert." A crisis situation leads to a crises when the system takes a jump in behavior. This happens when the pull between attractors causes the description of the situation to leave (move out of) the bifurcation set. Keep in mind that this bifurcation set, while defined in control space, is influenced by all five variables. Thus crisis situations are purely perceptual affairs, they occur in the control space. When these situations cross a threshold, the system shifts its behavior. This shift in behavior is the shift to crises. It defines a crisis.

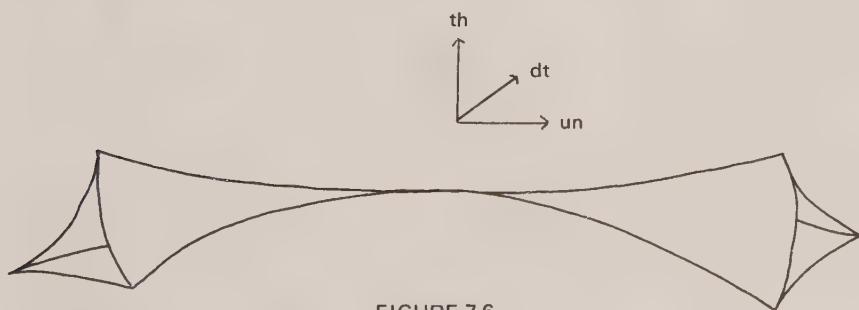


FIGURE 7.6

THE BIFURCATION SET FOR THE ELLIPTIC UMBILIC CATASTROPHE
DEPICTING INTERNATIONAL CRISIS

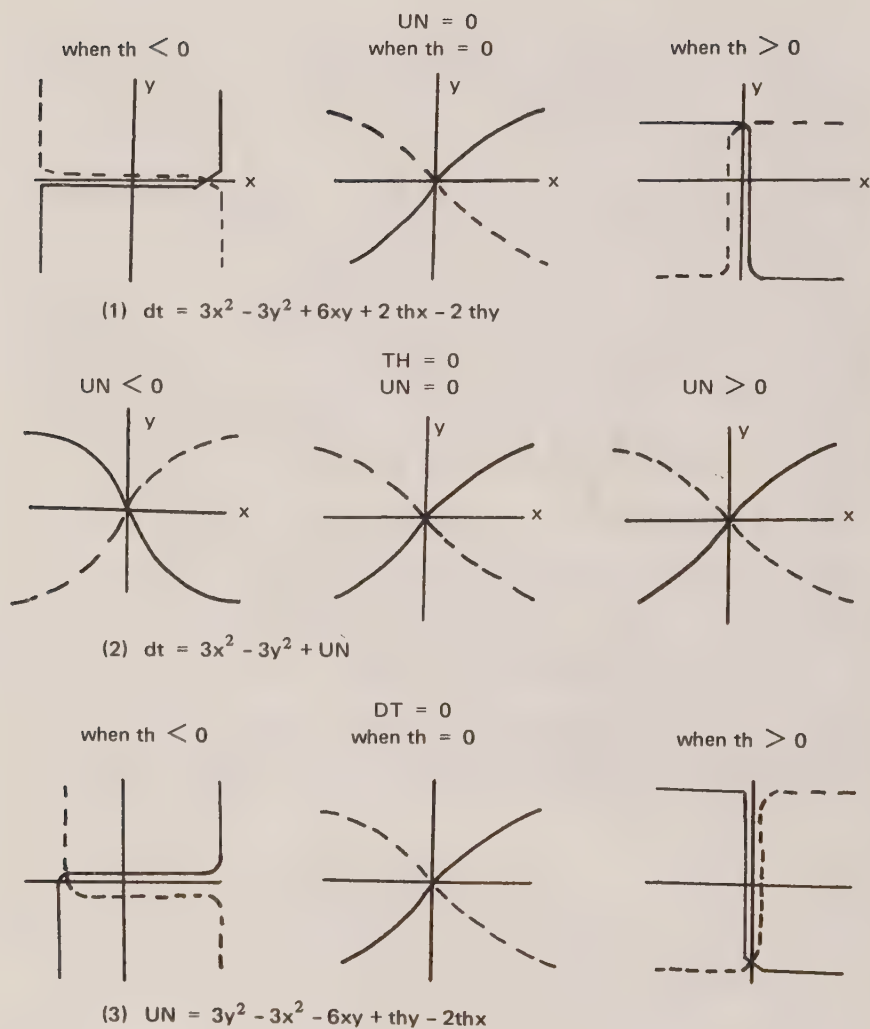


FIGURE 7.7

ELLIPTIC UMBILIC CATASTROPHE IN FOUR-DIMENSIONAL SPACE

Unlike the behavioral space of the cusp model discussed earlier, the elliptic umbilic behavior space is a function of five variables. Due to this, it is rather difficult to provide a geometric description of the entire behavior space. We can, however, "slice" up the model to get some intuitive idea of what the behavior space looks like.

As in the cusp model, it is possible to define the critical points for the elliptic umbilic. Since this is a multivariate model the critical points are defined by the interaction of a number of variables, however, instead of a single behavior variable.

$$dt = 3x^2 - 3y^2 + th \ x \quad (9)$$

where x = military behavior.

Decision time and its critical point are defined as a function of three variables. The degree of military behavior plays an important role in the equation. Equation 9 argues that decision time is positively related to the amount of military behavior as well as the interaction of threat with military behavior. The equation also asserts that the status of operating procedures is inversely related to decision time. Thus military actions taken early in a crisis provides time to figure out strategies which are appropriate to the situation.

If one assumes that threat is equal to zero in this equation, decision time is a function of the two behavioral variables. If one eliminates the threat dimension from the function dt takes on low negative values when the variable "operating procedures" is larger than the conflict action variable.

When threat remains in the equation the impact of military behavior on decision time is multiplied by threat. Then under high stress periods (high threat periods) decision time tends to increase until the emergency operating procedures reach a point at which they can provide critical information to key decision makers. These assertions appear acceptable. In truly high threat situations the key decision makers might have just been informed of incoming missiles. This threat would immediately set off the Strategic Integrated Operational Plan (SIOP). At this point the system would be in a state of readiness considerably higher than military actions. Here decision time would be low and immediate acts would likely be ABM and counter strikes aimed at providing decision time.

Now consider a low level military crisis with little direct threat such as a coup or revolution in another country which may affect US citizens. In this instance the operating procedures are likely to be low but military actions must be taken to retrieve endangered citizens (evacuation, marine support, etc.). The equation argues that decision time would presumably be large due to a low level C^3 problem but rather obvious military activity.

The critical point for uncertainty is defined in the following equation:

$$un = -6xy + 2 \ th \ y \quad (10)$$

The first variable of the equation is an interaction variable dealing with the two behavior variables. When the two behavior variables are in opposition (that is they have different signs) uncertainty is going to grow. The second variable is an interaction variable also. The second variable states that the interaction between threat and operating procedures is in a positive relationship with uncertainty. Thus it appears that the preparedness of command and control procedures operates interactively with military behavior to reduce uncertainty and with threat to increase it. Herein may lie the dilemma found in most attempts to prescribe better procedures for dealing with crises. It is the nature of procedures that they are combined with action in ways which can provide the national command authorities with more information and less uncertainty about the unfolding crises. In this way they combine with threat to create tension, and the perception of a need to know even more about a situation; in other words, a perception of uncertainty.

Removing the status of operational procedures (y) from equation 10 we find that as military action increases, uncertainty reduces while threat has the opposite effect. Thus, when threat exceeds military response by the appropriate ratios ($2/6$), uncertainty will rise. Military action appears designed to reduce threat *and* uncertainty of the outcome.

The final critical point which is of concern is threat. Unlike the other two control variables, threat is a function of a single behavioral variable — military behavior.

$$th = \pm 3x \quad (11)$$

Intuitively this function is easily acceptable. The important aspect is that the military behavior variable can be in either a positive or negative relationship with threat.

There is good substantive reason for both the negative and positive relationship. In terms of the negative relationship the use of force usually occurs when threat is high. In terms of the positive relationship, the use of military behavior can relieve the threat from the international system. That is, the ability of the system to produce some type of military output in a situation will create an effect which lessens that threat. It also begs the question, whose ox is getting goaded when a nation employs military action. In one sense it ought to drive down threat but it also frequently commits troops to distant places which are hard to resupply, defend, or control from the national command authority. Thus, whether the commitment of troops lessens or exacerbates the threat is highlighted by the acceptability of both signs in equation (11).

The behavior surface is described when $\frac{\partial f}{\partial x} = \frac{\partial f}{\partial y} = 0$. Treating the elliptic umbilic as a description of crisis, the behavior surface is defined as:

$$3x^2 - 3y^2 + 2th\ x - dt + 6xy - 2\ th\ y + un = 0 \quad (12)$$

If it is assumed that all of the control variables are equal to zero, then the behavior surface can be defined as:

$$3x^2 - 3y^2 + 6\ xy = 0 \quad (13)$$

This relationship is described in Figure 7.8.

Thom (1975, p. 78) has noted that the point $dt = un = th = 0$ is the only stable point around the origin. If threat varies in either direction, there is the potential for catastrophe.

The threat variable then is a necessary element in any crisis. If threat is lacking, there is no stress and the system can not enter into a crisis situation. There are two points which follow from the importance of threat. First, threat is a necessary but *not* a sufficient cause for crisis. (It is a sufficient cause for a crisis situation.) Crisis can only occur when there is that sudden shift in behavior. Therefore, some existing level of action, decision time or uncertainty must also be considered in describing a crisis. Second, as in the cusp model, regarding the magnitude of threat, the splitting factor will determine the severity of the behavior change.⁷ The greater the magnitude of threat the greater the magnitude of the potential shift in behavior.

We can add the threat (th) dimension to the model and thereby move from a two to three dimensional model.⁸ If it is assumed that both uncertainty and decision time are equal to zero, then the equation defining the behavior space becomes:

$$3x^2 - 3y^2 + 2th\ x - 2\ th\ y + 6xy = 0 \quad (14)$$

$$\text{or } th = \frac{3x^2 - 3y^2 + 6xy}{(2y - 2x)}$$

Threat is an important variable in the elliptic umbilic since it is the only control variable which creates an interactive component in the equation of the behavior surface (+2 th x or -2 th y). What this means is that it is the amount and direction of threat which determines how big the jump will be in the behavior surface.

One needs only read the newspaper accounts of what occurs in the situation rooms of the White House or Pentagon to realize the importance given to threat and threat projections. Indeed threat is an integral part of the planning process in developing contingency plans for dealing with crises. The defense conditions, frequently referred to as DEFCONS, are defined in terms of perceived threat. Thus, military preparedness is usually envisioned as a function of perceived threat.

Figure 7.8 is important in interpreting the relationship between threat and

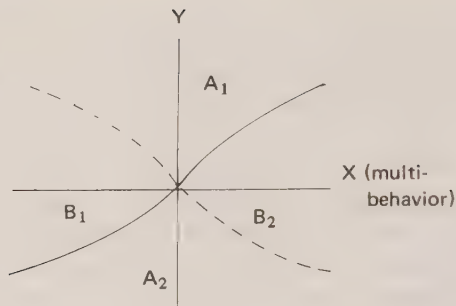


FIGURE 7.8

DEFINING THE RELATIONSHIP BETWEEN THREAT AND
THE BEHAVIORAL VARIABLE IN THE ELLIPTIC UMBILIC

A_1, A_2 = positive values
 B_1, B_2 = negative values

military operating procedures. The relationship defined in Figure 7.7 divides the behavior surface into four quadrants. The boundaries for these four quadrants are defined by equation 6. In the quadrants defined as A_1 and A_2 in the figure, threat takes on positive values. In the quadrants defined by B_1 and B_2 , threat takes on negative values. This provides the following hypotheses:

Assuming $un = 0$, $dt = 0$

- H_A : When threat is below normal, the magnitude of military activity is greater than operational preparedness.
- H_B : When decision time is low, military behavior and operating procedures are abnormal in opposite directions. (i.e., if $x = +$ and $y = -$ then $dt = -$ OR if $x = -$ and $y = +$ then $dt = -$).

Operational preparedness is meant to support policy in time of crises. Thus, a smooth running system consists of an appropriate degree of organizational support for the requisite behavior options considered. Significant shifts in behavior or preparedness are usually spasmodic shifts designed to influence the future policy options open to the President and his national security advisors. Such shifts are designed to provide time for action or to allow action in light of a lack of time. The hypotheses asserts that regarding military behavior, command and control go hand in hand when decision time is plentiful. But when the need to act quickly is acute, there is a growing imbalance between control and action. Thus, shortened decision time can cause actions to out distance control over a nation's next moves.

If it is assumed that threat and decision time equal zero, it is possible to describe system behavior in terms of the following relationship:

$$3y^2 - 3x^2 - 6xy = un \quad (15)$$

This relationship provides the following two hypotheses:

- H_A: When uncertainty is high, military behavior and operating procedures are abnormal and in a different direction.
 H_B: When uncertainty is low, military behavior and operating procedures are abnormal and in the same direction. (i.e., if $x = +$ and $y = +$ then $un = -$ OR if $x = -$ then $un = +$).

Here the same point made earlier concerning decision time is being argued. Abnormal relative positions of one of the two behavioral positions signals a view of the world that is out of focus. When time is pressing and/or knowledge is short, decision makers run the danger of losing control.

The next step in explaining the model is allowing two control variables to vary holding one at zero. This now puts the model into four dimensions.

$$\begin{aligned} 3x^2 - 3y^2 + 6xy - dt + un &= 0 \\ 3y^2 - 3y^2 + 6xy + un &= dt \\ 3y^2 - 3x^2 - 6xy + dt &= un \end{aligned} \quad (16)$$

The inclusions of the fourth control variable merely move the relationships described in the earlier equations in the direction of uncertainty or decision time. Due to this property of the model the purpose of each of the control variables in the model can be labeled. That is:

- threat = splitting factor
 uncertainty = normal factor 1
 decision time = normal factor 2

The figure (7.8) defining the behavior surface in terms of four dimensions provides an example of the importance of threat as a control variable in the model. When threat is equal to zero no crisis occurs in the behavior of the system. It is only when threat has a positive or negative value that folds occur in the behavior surface. Since this is the case, it is appropriate to call threat the splitting factor of the model. Decision time and uncertainty are called normal factors. These latter two variables do not split behavior. Rather the variables act as some initial control on the relationships. Essentially these variables shift the relationship away from the original point of the surface, but do not affect the folding of the surface. (See Zeeman and Isnard, 1972, for an explanation of normal and splitting factors in the cusp model.)

The model is described in four dimensions for two reasons. First, it provides further information regarding the relationship involved in the model. Second, and of more importance, it provides a complete description of the model along a single control variable axis.

For example, when decision time is defined as a function of three variables, we get the following two equations:

$$3x^2 - 3y^2 + 6xy + 2th\ x - 2th\ y = dt \quad (17)$$

$$3x^2 - 3y^2 + 6xy + un = dt \quad (18)$$

The first and second equations provide a description of the behavior surface when uncertainty and threat are equal zero respectively.

The second equation can also be expressed as a function of uncertainty:

$$3x^2 - 3y^2 + 6xy - dt = -un$$

$$\text{or } 3y^2 - 3x^2 - 6xy + dt = un.$$

To show that the above equation is equal to equation (15), we substitute back into equation (18).

$$3x^2 - 3y^2 + 6xy + un = dt$$

$$3x^2 - 3y^2 + 6xy + (3y^2 - 3x^2 - 6xy + dt) = dt$$

$$dt = dt$$

Defining uncertainty in four dimensions provides still more information about the model. We can define uncertainty allowing decision time to equal zero.

$$3y^2 - 3x^2 - 6xy + 2th\ y - 2th\ x = un \quad (19)$$

These relationships take on an added meaning when viewed as descriptions of a "critical curve" which locates points where each of the control variables can be defined as positive or negative. Rigorous definition of these lines will provide a division of the behavior space into the areas where each of the control variables can be considered positive or negative.

By finding the partial derivatives for each of the three equations above, we can determine the slope of each of the curves:

Function	Slope
$dt = 3x^2 - 3y^2 + 6xy + 2th\ x = th\ y$	$x = -y - 1/3\ th$ and $x = y + 1/3\ th$
$dt = 3x^2 - 3y^2 + un$	$x = y$ and $x = -y$
$un = 3y^2 - 3x^2 - 6xy + 2th\ y - 2th\ x$	$x = +y - 1/3\ th$; $x = y + 1/3\ th$

Adding a third dimension to each of these two dimensional slices would provide information on the variables which the equation defines. The first set of figures provides information on uncertainty, the second set on decision time,

and the third set on threat. Notice that each one of the figures allows for an explanation of variability in the defining variables. Unfortunately, this still does not provide information on where the control variables take on positive or negative values.

This series of equations and graphs helps delineate the type of behavioral shifts that can be expected as conditions in the control values shift. There are always two plot lines since the equations represent both negative and positive values for x and y . These figures suggest that cusps in behavior space occur as the control values take on larger (+ or -) values. The strongest single factor appears to be threat. Under normal threat conditions, disjoint shifts in action or in C^3 procedures are unlikely. Thus, the threat = 0 figures all depict simple curvilinear relationships between x and y . But as threat is significantly reduced or increased, shifts in behavior become highly likely. Under normal uncertainty and/or decision times, abrupt changes in behavior are expected to be along the x axis (the level of military activity) in response to changes in threat when threat has been less than normal. Thus, in those relations which are characterized as low threat situations, minor shifts in the current level of threat can lead to abrupt shifts in the level of military activity. On the other end of the threat continuum, minor shifts in normally high threat situations activate significant shifts in C^3 procedures. In the US case this suggests that shifts in the high threat area signal shifts in alert conditions of strategic forces before it signals shifts in actual military behavior.

The relationships described on the preceding pages represent potential situations in which the decision making system is placed. The hypotheses represents the relationship between control (or situational) variables and behavior. What this amounts to is a combination of two previous approaches to crisis. First, there is emphasis on the internal structure and perceived stimuli (control variables). This emphasis corresponds to concerns from the decision making approach. Second, emphasis on behavior corresponds to the systemic studies as employed by McClelland. In the elliptic umbilic the combination of perception and current behavior levels epitomizes this marriage of approaches.

One way to understand this relationship between decision making and systemic behavioral approaches is to view the hypotheses as depicting situations and potential response execution patterns of the decision making system. The response behavior on the part of the nation is dependent upon how it perceives, or interprets signals from the outer environment. How high is the threat? How much time do we have to act? How certain are we about our image of what is happening? Essentially then the answers to the questions describe "alternative" situations in which the crisis management system can be found. The derivations tell us the implications of variability in the environment of crisis decision making and actions.

A flow chart was used in our description of the crisis warning signals (Figure 7.9). It allows us to explicitly locate agency perceptions for specific behavioral outputs. The flow chart provides a simple means of locating expected behavior. For example, equation 12 defines a situation where threat, decision time and uncertainty are all above normal. The behavioral shifts in this multi-dimensional ellipse will be very different than the case when equation (13) specifies the behavioral output.

The second reason we used a flow chart was to emphasize that the behavioral output was a result of a decision making process. This process is left undefined but we feel that perceptual indicators play a role in the process. The black box of decision making is outlined by the perceptions that define a situation. Perceptions provide important information that influence particular functional aspects of the decision making process. The flow chart provides a rough mapping of this process.

The model allows for several interesting policy referents. First, watch out for critical points in terms of control variables as they signal abrupt shifts in response to crises. The empirical determination of a critical point is defined in more detail in the next chapter. Essentially this is an investigation into the proper measurement properties for a real world manipulable variable. The operational definitions will have to incorporate measurable referents of the policy maker.

Second, the derivations of the models presented here suggest that once a crisis has been instigated, it is not an easy manner to: "go back the way we came." We can expect some resistance to the cessation of conflict in general as a function of decision makers lack of decision time and uncertainty about the meaning of events.

Another disquieting aspect of this model is the stress it places upon uncontrolled behavior. As yet the assertions require empirical testing. But the implications are clear. In situations of short decision time and/or high uncertainty, it is quite possible for nations to lack the command and control alertness necessary to manage the actions of the military.

The model also suggests that the tendency to be caught with an uncontrolled need to respond militarily is greatest in low threat periods like the present detente era. The derivations suggest that during high tension levels in which there is a constant state of alert the command and control systems are able to handle emergencies better than during low threat periods. In the latter case, they might slip below the minimum level of alert needed to wisely control military activity.

Perhaps the most important aspect of this qualitative exercise is the highlighting of the role of threat in the crisis world. Employing perceptual variables of uncertainty, decision time and threat, the model suggests that threat is the

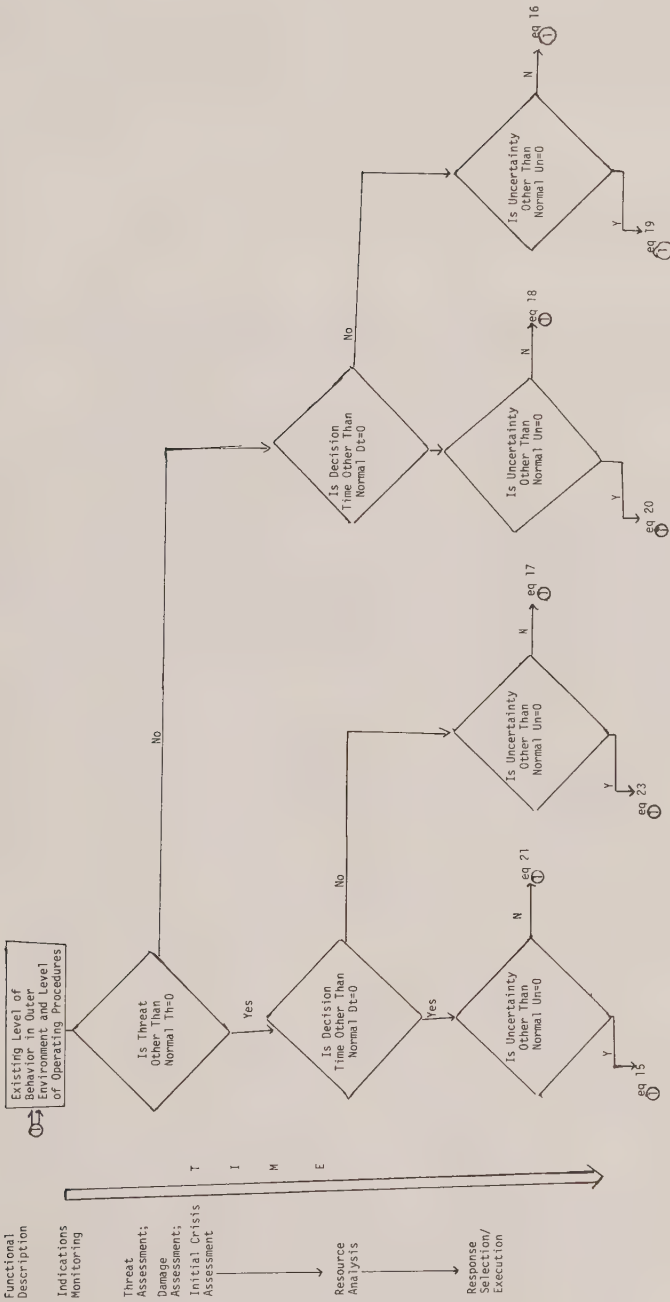


FIGURE 7.9
FLOW CHART OF CRISES MONITORING FUNCTION

driving variable defining crisis behavior. Thus, we conclude, that other perceptual variables affect the strategy of the way the game is played. But if the name of the game you aim to play is crisis management, threat is the go no-go variable.

Notes

1. This material has been adapted from the original version which appeared in the *Journal of Peace Research*, No. 3, Vol. XV, 1978, pp. 259-271. With permission of The International Peace Research Institute, Oslo.
2. Robinson (1968 p. 116) first suggested these differences in the definition of crisis. He notes, however, that while such definitions have enhanced the use of this term, their use has also revealed a serious dilemma confronting crisis investigations: "Definitions (of crisis) are either extraordinarily precise and specific and hence not widely applicable to a variety of situations, organizations, and subjects. Or they are so broadly inclusive and so unrestricted in meaning as to make it difficult to distinguish crisis from non-crisis. Either so many values are given to the variable that it cannot conveniently be hypothetically related to variations in the values of other factors, or it is categorized as crisis or non-crisis with the effect that analyses are gross and indiscriminate."
3. See Phillips and Rimkunas (1977) for a development of these mappings.
4. Since the behavior surfaces is defined by a differential, equation X must follow this "delay rule" (Isnard and Zeeman, 1972).
5. Thom does this for a number of social structures in Chapter 13 of *Structural Stability*, 1975.
6. These points emphasize the need to provide empirical reference for the five variables. The authors are progressing in that direction now.
7. See Isnard and Zeeman for an explanation of normal and splitting factors in the cusp model (1972).
8. We will follow the procedure here of increasing the complexity of our model systematically by adding control variables one at a time.

Chapter VIII

A Few Implications for Crisis Management from Catastrophe Theory

"Hallo," said Piglet, "what are you doing?"

"Hunting," said Pooh.

"Hunting what?"

"Tracking something," said Winnie-the-Pooh mysteriously.

"Tracking what?" said Piglet, coming closer.

"That's just what I ask myself, I ask myself, what?"

"What do you think you'll answer?"

"I shall have to wait until I catch up with it," said Winnie-the-Pooh.¹

For the political scientist, anticipating crises has been a discouraging situation all too painfully similar to Winnie-the-Pooh's tracking. Our poor analyst finds himself gathering records of who said or did what to whom, coding his material according to several alternative schemes and attempting to develop indicators of yet more abstract phenomenon in the hope that insights will be gained by amassing, recombining, and reviewing existential experience. In the policy community, the information gathering mechanisms of the nation are also continually collecting, sorting and evaluating indicators of international intent and capability. These indicators are usually difficult to interpret or to reach agreement on concerning their meaning. Only when the obvious occurs, when there are relatively tremendous shifts in behavior or conditions do national actors seem to agree on what has happened.

As we have argued already, the reason for this morass in both the academic community and public agencies stems from the lack of a complete (thorough) conceptualization of crises and that the reason for this conceptual inadequacy is the lack of an analytic framework in which to place the concept "crisis."

To this point we have been attempting to develop an explicit model for locating the concept of crisis. If it is true that the impact of crises on behavior can be likened to a step-level function of perceived hostility, then past efforts at tracking crises in the field have been largely in vain.

By this we mean to suggest that most tracking is a waste of time in a policy domain unless it is combined with theoretical models which anticipate these shifts. The mere identification of shifts may be of passing interest to academics but it is already a fact of life to a policy analyst who wishes his friends in the academic community would have forewarned him (Belden, 1977).

Crises are potentially imminent when there is perception of hostility comprised of a high degree of threat to a nation and a concomitant degree of uncertainty about other actors' future moves as well as a concomitant amount of decision time. We see perceptions (of threat, decision time, and uncertainty) mapping onto behavior. It is the situation (the perceived context) which leads to crisis behavior.

Our use of catastrophe theory is an attempt to capture the essential nature of these relationships between perception and behaviors characteristic of crises. To employ the geometry of catastrophe theory we have asserted that crises resemble step functions and that crisis dynamics are driven by uncertainty, threat, and decision time. The descriptive geometry of catastrophe theory is useful for providing a resultant set of relationships of threat and uncertainty, and decision time to behavior. It is important to point out, however, that the substantive relationships result from the assumptions about the splitting function of threat, the appropriateness of the variables of decision time and uncertainty, and the step function-like character of crisis situation as interpreted by the geometry of catastrophe theory. The "theory" is not in and of itself, relevant to the substantive domain of crises. Whether the relationships are relevant or not is dependent upon their logical acceptance and empirical examination.

For catastrophe theory to be useful it must provide a heuristic value in studying crises, it must incorporate the major definitional aspects of crises delineated above and it must account for disparate empirical findings which exist in the literatures today. Eventually it must stand the test of empirical falsification.

A. The Cusp Catastrophe

The catastrophe model that we will explore in this paper is known as the cusp catastrophe. Elsewhere we have developed the implications for it and the elliptic umbilic (Chapter VII). The cusp catastrophe model in this chapter consists of two control parameters and a single behavior variable. In our model the two control parameters reflect an actor's perception (the degree of hostility received from the outer environment). The two dimensions used in describing the control space are threat and uncertainty. Threat is the splitting factor in the model, while uncertainty is the triggering factor. Threat is a splitting factor because it is the perception which forces behavior to be bimodal. That is, in a high threat situation it is not at all clear whether an actor will respond in a cooperative mode in an attempt to minimize losses or in a conflictual mode in an attempt to gain its goals through brute force. Uncertainty is seen as a triggering dimension since it is the degree of uncertainty in combination with threat which

leads to some change (or shift) in behavior. The behavior variable employed in the model is a dimension that measures the degree of conflict in an actor's response. The dimension covers a range from cooperative behavior to conflictual behavior. It reflects the intent of the actor under study.

Combinations of movements in the two perceptual variables are reflected in a movement in the behavioral response of an actor. The behavioral response is viewed to take place on a continuum that goes on the low end from cooperation to conflictual acts on the high end.

The relationships between each of the variables can be synthesized onto a single three-dimensional graph (Figure 8.1). One of the real assets of the Thom models is that they allow us to look at the interaction between relationships as well as between variables.

The cusp model's behavior and control space is defined by the function:

$$f(dt, th, x) = 1/4 X^4 + 1/2 th X^2 + un X \quad (1)$$

In terms of the behavior and control space:

$$R^2 \times R^1 \rightarrow R^3$$

The coordinate system R is a three-dimensional system consisting of a control space comprised of two independent variables, threat (th) and uncertainty (un) and a behavior space comprised of a single dependent variable, behavior (X).

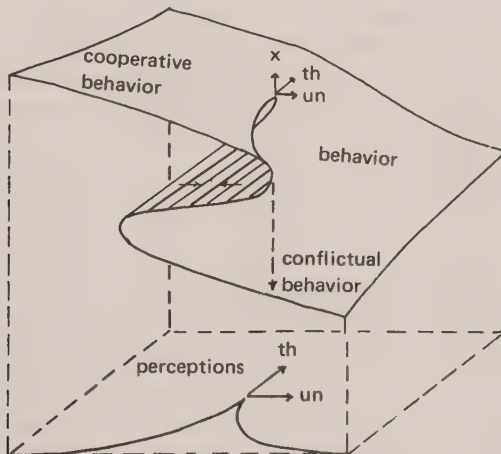


FIGURE 8.1

THE CUSP CATASTROPHE DEPICTING INTERNATIONAL CRISIS

The model can be viewed as mapping the perceptions of an actor onto his behavior response. This surface is defined by finding the partial derivative of X (the behavior variable) and setting that derivative equal to zero.

$$\frac{\partial f}{\partial x} = X^3 + th X + un = 0 \quad (2)$$

Plotting this derivative over a large number of values for each of the variables we get the three-dimensional surface shown in Figure 8.1.

The most important aspect of the behavior surface of this cube in Figure 8.1 is the fold found on it. This fold defines the sudden transition in behavior. Recall that it is sudden transitions in behavior that we argue are characteristic of crises. The question in catastrophe theory terms becomes when does behavior stay on the bottom surface of the fold, when does it shift surfaces and when does it remain on the top surface of the fold. Since we are dealing with a single dimension of behavior, the behavior must either be on the top surface or the bottom surface of the fold, it never stays in the cusp area.

When behavior is in the fold area — the cusp when we are analyzing the control space — it will be stable until it reaches a critical point. When it reaches the critical point, it will *change* or shift to the other surface of the fold.

To determine the fold area as it is projected on the control space thereby reflecting the "cusp," we eliminate the behavior variable from equation 2.

$$4un^3 + 27th^2 \leq 0 \quad (3)$$

The control space is the perceptual field we have been talking about up to this formal development. The equation defines the crisis situation.

The equation is less than or equal to zero because we are concerned with all of the area within the fold. This control space is a two-dimensional figure (Figure 8.2).

In order to determine the types of behavior associated with certain perceived situations, we have defined local sections of the catastrophe manifold or behavior space (Figure 8.1). First, it is necessary to define a parameter value $th = \phi$ (threat). This divides the space into two local areas: an area of gradual change in behavior and an area of catastrophic change in behavior. Notice that in the areas covered by quadrants 1 and 2 as uncertainty moves from the left to the right (from less to more uncertainty), behavior moves from cooperation to more and more conflictual behavior. Therefore, in a situation of low threat (i.e. perceived threat $< \phi$):

H_a : As uncertainty decreases, the amount of conflict behavior of the actor decreases ($\partial f / \partial un < 0$).

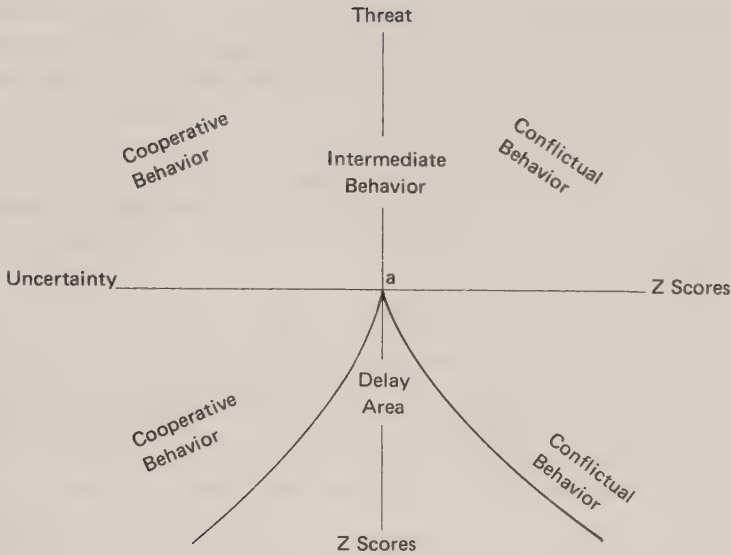


FIGURE 8.2

The Control Space

In most relations between two nations there exists a limit to the amount of cooperation or conflictual behavior found in any given situation. (At X maximum, the maximum amount of force envisioned is used by the actor.) This point is understood to be equivalent to the efficiency criteria in economics. The definition of efficiency in this case being the maximum amount of conflictual output that is technologically capable in a given relationship. At X minimum, the actor is as cooperative as possible given the local situation.

As threat increases beyond some level ($th = \phi$) the following descriptions of behavior emerge:

- H_b : For high levels of uncertainty, expect actors to be in a conflictual mood.
- H_c : If uncertainty is very low, expect the actor to exhibit cooperative behavior.
- H_d : If uncertainty places perceptions within the cusp, either behavior is possible, depending on previous behavior.

Notice that hypothesis (H_d) fits well with McClelland's definitions of crises. He argues that in adversary relations, relative uncertainties (H_{rel}) of about .6 signal a crisis (McClelland, 1968). He has found, however, that these levels are not always appropriate. Phillips and Crain (1974) have found that a U-shaped curve describes the relationship between uncertainty and reciprocity in which reciprocity breaks down in the intermediate levels of uncertainty. Catastrophe

theory puts these findings into a broader framework. It suggests that threat defines the impact of uncertainty upon behavior. Indeed, if our arguments about variables and the nature of crises is correct, Thom's cusp model indicates that it is particular combinations of threat and uncertainty as represented by the curves in quadrants 3 and 4, Figure 8.2, which demarcate the perceptual thresholds for crises. These curves encompass the apparent discrepancy discerned by McClelland in that crises occur only in high threat situations. They are consistent with the U-shape relationship of Phillips and Crain since in either extreme behavior is straightforward enough.

We can summarize the implications of Figure 8.1.

- A - If threat and uncertainty are both below normal ($th < \phi$, $un < \phi$) then behavior is cooperative (i.e. it rests in quadrant 2 of Figure 8.1).
- B - If threat is greater than normal ($th > \phi$) and uncertainty lies in its intermediate ranges ($un_L \leq un \leq un_H$) then behavior would be of an intermediate mode (i.e. slightly stressful but not conflictual).
- C - If threat is below normal ($th < \phi$) and uncertainty is high ($un < un_H$) behavior is conflictual.
- D - If threat and uncertainty are both normal or less ($th \leq \phi$, $un \leq \phi$) but the joint values of threat and uncertainty stay outside of the curve in quadrant 3: ($th^3 + 27 un^2 > 0$) behavior is cooperative.
- E - If threat is normal or less but the joint score of threat and uncertainty places the situation inside of the angle formed by the curves in quadrants 3 and 4: ($4th^3 + 27 un^2 \leq 0$) then behavior can be either conflictual or cooperative.
- F - If threat remains in this range, but the joint summation of threat and uncertainty forces the perception to cross the line ($4th^3 + 27 un^2 > 0$), there is a crisis.
- G - When the situation is in quadrant 4 or more to the right of the curve ($4th^3 + 27 un^2 > 0$) is conflictual.

An equilibrium point can also be defined on the behavior surface when $\partial un / \partial th = 0$ and $\partial th / \partial un = 0$.

This equilibrium is the point defined in the control space in which there is *no* movement in the perceptions of threat *or* uncertainty. Equilibrium is a state where there is no change in threat or uncertainty. Thus, an actor is in equilibrium when his perceptions of his environment do not reflect any type of disturbance going on. This definition of equilibrium says nothing about movement in the outer environment of an actor. Rather, it implies that there is no apparent movement on those dimensions that reflect an actor's perceptions of his outer environment.

Based on the above description of the behavior surface, it is possible to develop a set of local scenarios.

If an equilibrium point is found in quadrants 1 and 2 in the catastrophe map, movement on the surface will be of the *non-crisis* type. That is, if threat does not exceed some threshold the movement on the behavior surface is seen as gradual.

It is only when movement in the threat direction exceeds $th = \phi$ that the actor risks the danger of a crisis. Further, in order to *avoid* crisis behavior, threat must be kept within the following threshold:

$$4th^3 > un^2$$

The point is that a nation's threat must be an unequivocal signal which cannot be confused by uncertainty, if it wishes to avoid a crisis. If actions in the outer environment generate enough uncertainty such that

$$4th^3 + 27un^2 = 0$$

then the joint perceptions precipitate a crisis and the original 'acceptable' threat may initiate more than the actor had bargained for.

If there is a change in threat, such that threat crosses the mid-point on the threat continuum ($th < \phi$) and meets the above criteria, the actor would avoid a crisis. Graphically, movements of all non-crisis type of situations would look like the following (Figure 8.3). Notice that in all these cases the trajectories avoid the crisis situation area.

In one sense this restriction of movement on the part of the actor is too conservative. It is possible for the actor to enter the cusp area of the catastrophe map but still avoid the catastrophe jump defined as crisis. While the first scenario is the wisest, if a decision-maker (decision perceiver) is risk averse, the actor who believes in "brinkmanship" and is less risk averse may enter the cusp area and only have to meet the following criteria:

$$4th^3 > 27un^2$$

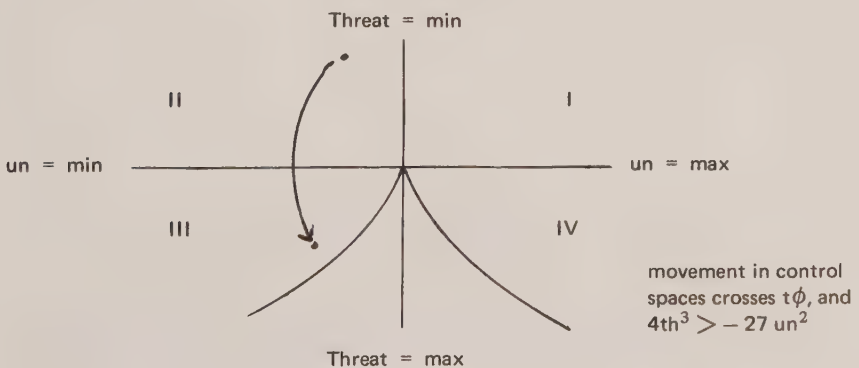


FIGURE 8.3

A RISK AVERSE DECISION ENVIRONMENT

The actor, given some set of behavior, will be able to maintain his existing behavior if he does not cross the bifurcation set (both lines). Thus, if behavior is cooperative, movement in the control space could be allowed to vary in both uncertainty and threat as in Figure 8.4.

Likewise, if behavior is conflictual, the actor is certain that his perception of the situation will not alter his response type (see Figure 8.5). In those crises

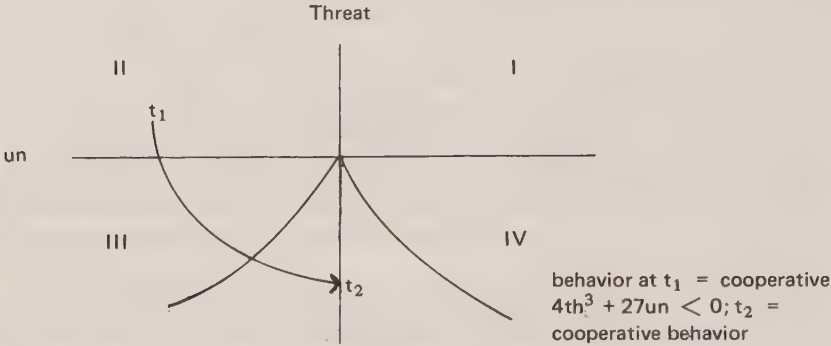


FIGURE 8.4

A 'BRINKMANSHIP' DECISION ENVIRONMENT

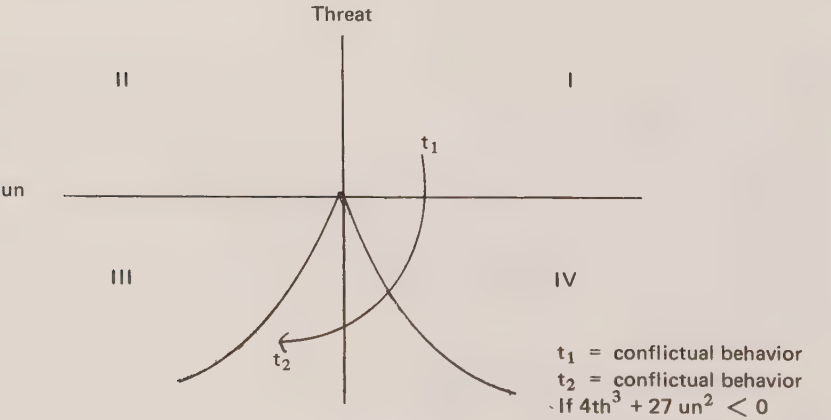


FIGURE 8.5

A CONFLICT MAINTAINING DECISION ENVIRONMENT

where the situation has moved across the threshold in quadrant 3 ($4th^3 + 27un^2 = 0$) but not across the second threshold in quadrant 4 ($4th^3 + 27un^2 > 0$), the actors have learned from the situation but the crisis did not break out into war. The obvious dangers inherent in this situation lead us to counsel prudence.

This type of decision rule (only meeting the bifurcation set criterion) while mathematically sound is at the least very dangerous. If, for example, at time t_2 an actor's perceptions "shift," there is a slight change in world view due to modifications of internal policies. This type of brinkmanship might easily lead to a crisis situation. It might also lead to movement away from the cusp, depending upon the direction of the shift of axis (Figure 8.6).

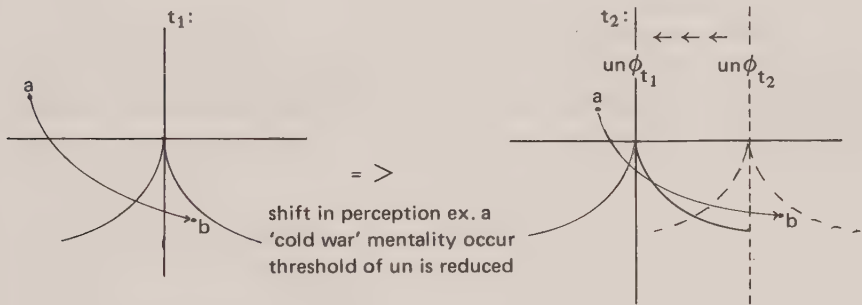


FIGURE 8.6

THE EFFECTS OF A CHANGE IN PERCEPTIONS

Given all of these types of possible situations occurring in the control space, the following rules prevail in the *cusp* crisis model:

1. If an actor is risk averse, he should avoid the cusp area of the catastrophe map.
2. If the actor is *not* risk averse and is sure there will be no dramatic shift in his perception, his movements on the perceptual screen can occur in any direction, as long as they do *not* cross the bifurcation lines.
3. A crisis may occur as a shift of world view rather than perceptual changes corresponding to actual shifts in event streams. Therefore, gradual changes in the perceptions of things are potentially as important as changes in strategy when it comes to forecasting crises.

B. An Initial Empirical Evaluation

This demarcation process is due to the mapping aspect of the catastrophe model. The mathematics of catastrophe is built upon the idea that the control surface is mapped onto the behavior surface. Due to this characteristic, movement in the control space is movement on the behavior space.

The mapping provides us with a geometrical figure as depicted in Figure 8.1. Notice, that the cusp on the control surface corresponds to the shift points on the behavior surface. The line running through quadrant 4 is the crisis line — it demarcates the shift from cooperative to conflictual behavior. The cusp line, running through quadrant 3 is a peace line. It demarcates a sudden transition from a conflict to a cooperative situation. This lack of symmetry in drastic transition is known as hysteresis.

For example, let us assume that there is a *low* threat situation. If threat stayed low, but uncertainty went from low to high, we can deduce from this movement that behavior will move from cooperative to conflictual, in a gradual manner (Figure 8.7).

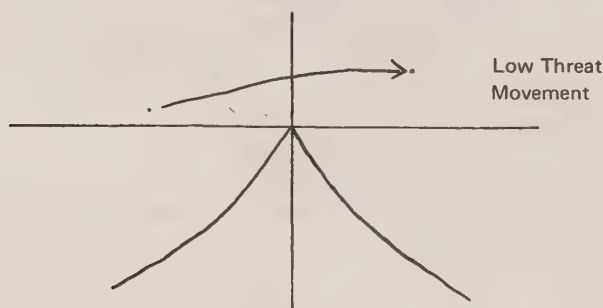


FIGURE 8.7

If, however, it is a high threat situation, threat staying the same, and uncertainty moving from a low to high level, the mapping assumption of the model postulates that there will be a step-transition change (Figure 8.8).

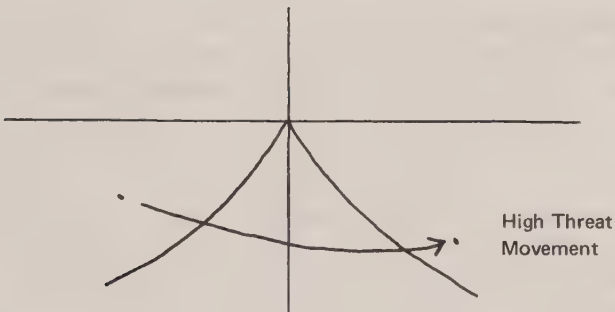
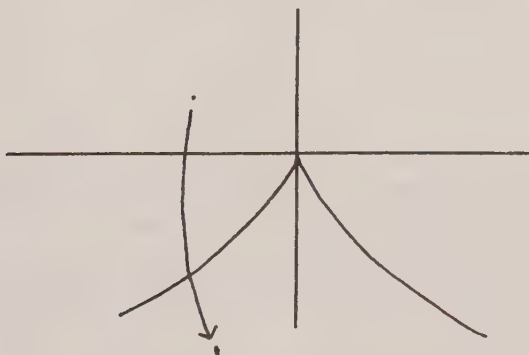


FIGURE 8.8

If, however, there is movement 'up and down' on the control surface rather than right to left, it implies that there is a movement in threat rather than uncertainty. If this is the case, there is little change in the mode of behavior (Figure 8.9).

Due to these characteristics of the model, threat is designated as a splitting factor, while uncertainty is designated as a normal factor. It is probably more appropriate to call uncertainty the triggering mechanism in this model. This is because, it is only the movement from low to high uncertainty, that will provide the step-transition that we designate as a crisis. But it is important to remember that this step-transition can only occur in a high threat situation.



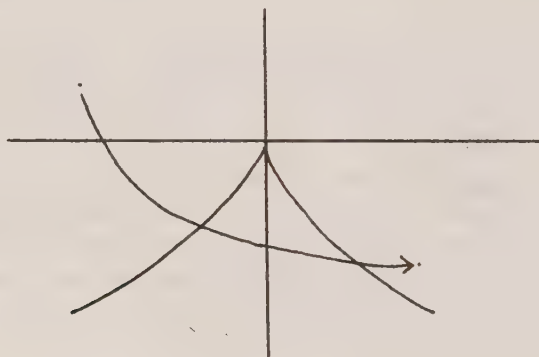
Movement on Threat Dimension

FIGURE 8.9

These characteristics allow for an infinite variety of movements which might be designated as a crisis. But these infinite movements must occur within a limited boundary of the surface. The most easily conceived movement which can be considered a crisis is an increase in threat with an increase in uncertainty (Figure 8.10).

As this type is depicted, it assumes that threat is below zero (some defined threshold). This is not a necessary requirement for this type of crisis to occur. The only requirements for this type of crisis, is that the movement of threat crosses the threshold point to become high (as well as the crisis line).

Another conceivable type of movement is a reduction in threat with an increase in uncertainty. The threat reduction can *not* cross the threshold demarcating a high threat situation. In this situation the reduction in threat is small relative to the amount of threat in the system.



Generic Description of Crisis

FIGURE 8.10

While this type of movement seems to go against our intuitive understanding of crisis, it is logically permissible in the mathematics of the model. Further, one might make an argument, that this type of movement is simply a member of the subset of crises that are triggered by a movement of uncertainty in a high threat situation. That is, although there is a reduction in threat, the reduction in threat is not enough to move it out of the characteristic movement of behavior depicted in Figure 8.11.

For our purposes here, the control space of the cusp catastrophe model maps onto a single behavior dimension of a nation. The model's initial assumption is that a nation's behavioral response to its environment is dependent upon its perception of that environment.

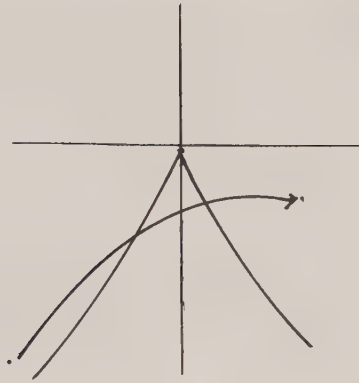


FIGURE 8.11

INTERNATIONAL CRISIS WITH REDUCTION IN THREAT VALUE

Second, the level of threat is a splitting factor. That is, the degree of threat forces a national actor to decide on one of two actions. In a high threat situation that actor must decide to send a cooperative act or a conflictual act. This situation is essentially different than in a low threat situation. In a low threat situation, the type of act sent by a nation is primarily a function of uncertainty (see Figure 8.12).

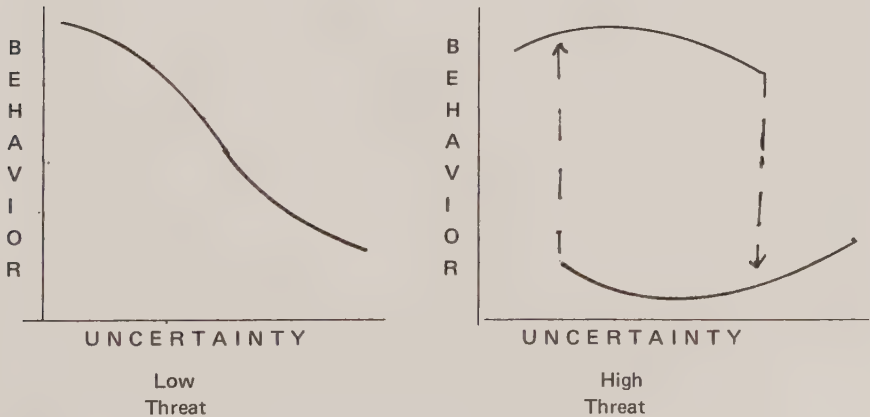


FIGURE 8.12

Behavior as a Function of Uncertainty With Control for Threat

Third, in all situations the actual type of behavior that is sent by a nation is triggered by the degree of uncertainty that is perceived by the actor. In a high threat situation, the degree of threat may set up the option for sudden and dramatic shifts in behavior, but the actual occurrence of the shift is dependent on the level of uncertainty. In a low threat situation, threat provides no shifting element, while uncertainty is still the dominant force in deciding upon the mode of action taken by a nation.

Finally, it is assumed that an actor will follow a 'delay rule.' That is, past behavior has an important effect on the next type of behavior sent by the actor. Actors whose last act was cooperative will most likely send a cooperative act this time. This allows for the drastic changes in behavior which seem to correspond to crises.

C. The Data

In order to test the conceptualization of crisis as a cusp catastrophe, we employed a data set developed by S. Andriole and R. Young (1977). The data set provides information on a number of indicators which allow for a plausible test of the model. The indicators provided by the data set are: total activity, cooperative activity, conflictual activity as well as a tension score of a H-rel score. These measures reflect the two-way flow of monthly activity between the two super powers — the US and USSR. Along with these measures a behavior variable was used to define the dominant type of activity for the time period. While this behavior measure will not allow us to fully describe the behavior surface, it provides a rough measure of movement on the surface. The period covered by the data was from January 1966 through December 1975.

This data contains 120 cases (12 months $\times$ 10 years). Given that our conception of crisis is related to a dynamic — the step-function — we need to look at movement of the variables. Due to this dynamic characteristic we will have 119 movements to work with in our analysis.

It was decided that the H-rel and tension scores could best be used as variables of the control surface of the model. The tension score is an interval measure which reflects the degree of threat between the two nations. The tension score is derived from the following algorithm.

$$\text{Tension} = \frac{\text{Conflict} - \text{Cooperation}}{\text{Conflict} + \text{Cooperation}} + 1 \times 50$$

The algorithm provides that the higher the number of conflictual acts in relation to the total acts, the more tension exists in the dyadic flow of events between the two super powers. This will be our surrogate measure for the threat variable in the cusp model.

The H-rel score is the measure borrowed from communications theory which reflects the degree of *uncertainty* in signals sent between two actors. The computation of H-rel is as follows:

$$H\text{-rel} = \frac{\sum_{i=Z}^N -P_i \log_2 P_i}{H \text{ max}}$$

where P_i is the independent probability of occurrence of signal type i and where there are N type of signals. $H \text{ max}$ is the maximum potential value of uncertainty. The range of H-rel is from zero to one. A score close to one reflects high uncertainty while one closer to zero reflects low uncertainty. We will use this measure as an uncertainty measure in the cusp model. Inherent in these operationalizations is the idea that the variety of the acts are a major way that international actors get a "fix" on their actors environment.

It is important to note that we are using monthly aggregations of the dyadic flow of events. While this aggregation process is a normal procedure in a good deal of international relations research, it creates a problem in the evaluation of catastrophe models. As has been noted earlier the catastrophe model description of step-function change in behavior is frequently dependent on small perturbations in the control variables. While the use of aggregate measures do not necessarily rule out small movement in the control variable, it is likely to mask moves. In most cases, the usage of aggregates is often buoyed by the "law of large numbers." It is argued that "the grouping of data often results in improvement of estimates (e.g. by reducing spuriously high degree of dispersion) (see E. K. Scheuch in Merritt and Rokkan, *Comparing Nations*, pp. 139-140). While this argument is generally true, without some check for autocorrelation processes we may be misleading ourselves. Autocorrelated processes will violate the independent trial assumption which the law of large numbers is based on. At the heart of the catastrophe model is the argument that normal day-to-day activity might just move the actor into the critical section of the surface, and a crisis is the result. Large movements by the variables in the control surface may not allow us to see when the international environment meets this component of the catastrophe model.

While this is an important element in a test of the model at this point in time, we are much more concerned with whether or not the model 'misfires.' We are concerned with how well the crossing of the "crisis line" on the control surface matches what most analysts refer to as international crisis.

The aggregation process does provide a strenuous testing mechanism in this search for a valid conceptualization of crisis. We will rely on the 'law of large numbers' and assume the aggregation process has reduced some of the spurious dispersion.² Given this assumption, defining a crisis simply as a deviant case is

less likely to occur by chance, and more likely to occur due to the actual mechanism of crisis. We are asking a preliminary test question: For each of the known crises did the perception variables cross the threshold lines for crises? We are also asking a comparison question: Did these thresholds get transgressed during recognized periods of peace? In short, how bad is the Type I and Type II errors when one applies the concepts of the control space of a cusp catastrophe model as operationalized here?

Central to any test of the catastrophe model is the need to identify a point on the control surface which marks the origin. Thom and other adherents to the approach are hasty in calling the beginning point of the cusp (point a, in Figure 8.2) the origin since they are working with qualitative mathematics.

Since this paper involves an empirical analysis, the point a must be defined quantitatively. We have decided to treat the origin as the zero point on each of the scales used to define the control surface in order to ease the mathematical manipulation of the model.

The first transformation that came to mind, to help in this definition of a zero point was the Z-score. The Z-score provides a standardized scale with a zero point as well as positive and negative scores. It provides the simplest type of number line to work with. The algorithm for Z scores used in the definition of the control surface is:

$$Z = \frac{X_i - \bar{X}}{SD} \quad \begin{array}{l} \bar{X} = \text{grand mean} \\ SD = \text{standard deviation} \end{array}$$

The Z scores present standardized data, which on first thought might force some subset of data points to be deviant points, thus creating a false image that a crisis is occurring. This problem is reduced to some extent by using such a large data base — 120 points. Most of these data points reflect periods of non-crisis activity. Points that are extremely deviant must, then, in some way be different. If simple statistical demarcation techniques were used, we might jump on the idea that these deviant points should be equated with crisis. The use of the catastrophe model, however, adds another restriction to our definitional process. The catastrophe model posits that crisis is a function of two data points and the difference between the two data points on two dimensions — threat and uncertainty.

To assure that the use of Z scores does not force a statistical artifact which we might consider a crisis, we looked at the Pearson's *r* between the Z scores for tension and uncertainty (see Table 8.1). Since our subsequent analysis is broken down into yearly sections, the relationship between these two indicators is presented in a similar fashion. This table reveals that there is no high correlation in any single year.

TABLE 8.1

The Relationship Between Z Scores for Tension and Uncertainty

<i>Year</i>	<i>Pearson's r</i>	<i>No. of Crisis on Control Surface</i>
1966	-.13722	0
1967	.1541	1
1968	.0154	2
1969	-.404	0
1970	-.06248	1
1971	.7114	1
1972	.4133	1
1973	.4797	0
1974	.6692	1
1975	.6687	0

D. Testing the Model

In order to access the utility of the cusp catastrophe model's definition of crisis, the movement of the two control variables were plotted over time. The control space of the model provides a way to delineate the actual occurrences of crises. First, those trigger points that demarcate change in behavior on the control surface are defined. Then the critical points for the behavior surface are found and the behavior variable from the equation is eliminated (see Chapter VII). This provides a mapping like that seen in Figure 8.2. The cusp line is defined by equation 3.

$$4th^3 + 27un^2 = 0 \quad (3)$$

Each of the cusp lines demarcate those values of perception which correspond to some type of shift in behavior. If a set of events moves from left to right in the space and crosses the line in quadrant 3 and 4, a crisis is hypothesized to occur. If there is movement in the opposite direction that is through quadrant 4 into quadrant 3, a shift from conflict behavior to cooperative behavior results. Movement back and forth like this, in quadrants 1 and 2 result in slower shifts in behavior. Figure 8.13 provides examples of each of these types of movements. Given these characteristics, the control surface can be defined. The right line of the "cusp" will be denoted as the "crisis threshold" while the left line will be denoted as the cooperation threshold. As the model stands, there are two types

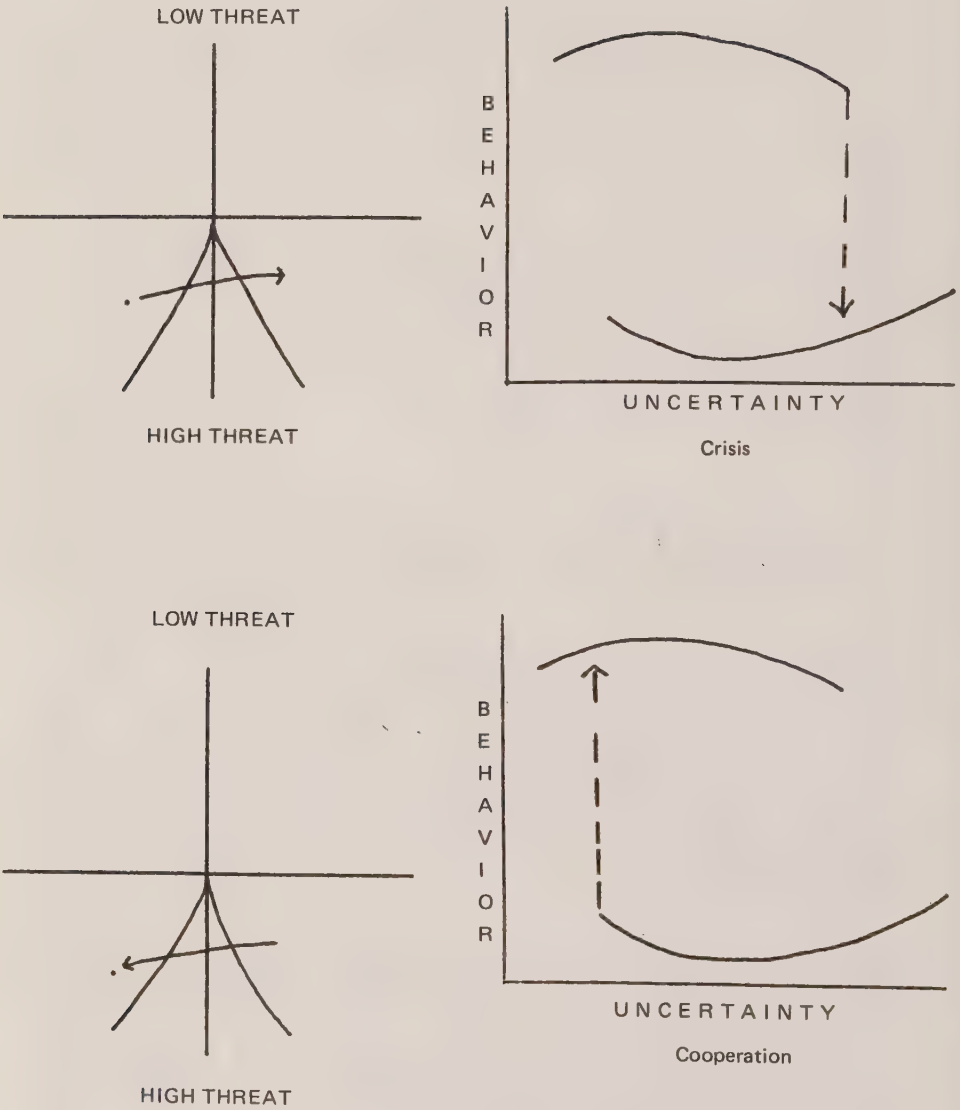


FIGURE 8.13

SHIFTS IN BEHAVIOR AS A FUNCTION OF STARTING POINT

of discontinuities: a crisis — which is a shift in behavior from a cooperative to a conflictual mode; and the “breaking out of peace” — which is a shift in behavior from a conflictual to a cooperative mode.

In Figure 8.2 there is an area defined within the ‘cusp’ ($4th^3 + 27un^2 < 0$) as the “delay area.” This represents that part of the model which follows the “delay rule.” When perceptions enter this area, the corresponding behavior is in the same mode as in the previous time period. There is no gradual change, as in quadrants 1 and 2. This characteristic provides the discontinuous shift in the model.

These theoretical characteristics provide an opportunity for a simple test of the validity of the model. By using the Z scores for tension and uncertainty over time, we can depict movement on the control surfaces. We will want to see if the time the values of the measures cross the crisis line, correspond with actual crises between the US-USSR.

In order to do this, we will compare the time frame in which perceptions cross the crisis line with other sources’ definitions of crisis. We have chosen the crises listings of Moore (1975); CACI (1976); Bleckman and Kaplan (1976) for comparison. These sources compiled lists of crises in the post-World War II period which provide a broad coverage of the concept of crisis. While there is a high degree of intersource reliability in these three sources, each source’s perspective allows for the inclusion of a larger number of crises.

E. The Results

The list of crises compiled from the three sources — Bleckman and Kaplan, CACI, and Moore — which meet our two additional criteria are presented in Table 8.1. The two criteria for inclusion in the list are: (1) the crisis had to occur within the ten-year period that the data cover — 1966-1975; and (2) the crisis had to involve the Soviets and the US in some way. This second criteria is not as stringent as it appears, since involvement could have been as a third-party.

The Appendix presents year-by-year summaries of the monthly movement on the uncertainty and tension scores. In looking through the appendix, one is immediately struck with the discriminatory power of the model. There is a considerable amount of movement on the surface, yet a crisis only occurs eight times in the 119 movements on the surface for the ten-year period. The cusp catastrophe defines about six percent of the movement on the control surface as a crisis.

In 1966 no crises are picked up by the cusp model. Table 8.2 lists a single crisis occurring in 1966, the Rhodesian blockade. This crisis was primarily a British-Rhodesian crisis with minimal US and Soviet involvement. While no crisis

TABLE 8.2

CRISES IDENTIFIED AS OCCURRING BETWEEN 1966 AND 1975

<i>CRISIS</i>	<i>TIME FRAME</i>
Rhodesia Blockade	4/66
Sino-Soviet	1/67 – 2/67
Arab-Israeli	5/67 – 6/67
Cyprus	11/67 – 12/67
Israel-Jordan	1/68 – 3/68
Pueblo	1/68 – 2/68
Czech	7/68 – 10/68
Mid-East	2/69 – 4/69
Sino-Soviet	3/69 – 4/69
Bangladesh	11/71 – 12/71
Jordan	9/70
Mideast	10/73
Mayaguez	4/75 – 5/75
Vietnam Evacuation	4/75
Israel-Lebanon	12/68
Jordan-Syria	12/66
Greece	5/67
Cyprus	7/74

N = 18

is depicted when the Rhodesian crisis is supposed to appear, there is a considerable increase in the level of threat. Given the circumstances, it seems safe to argue that Rhodesia did not meet the criterion of high threat combined with high uncertainty which is at the heart of our definition of crisis.

In 1967 the cusp model picks up a crisis between May and June. According to our external sources this would correspond to the Arab-Israeli crisis. This shift is followed by movement in the conflict area of the surface. Thus, according to the cusp model the May-June Arab-Israeli crisis led to a conflictual situation over an extended number of months. There was a movement of decreasing threat with increasing uncertainty which led to the crisis. This movement is different from the accepted notion of increasing threat and uncertainty occurring at the same time. It highlights the interactive relationships between threat and uncertainty. Even in periods of perceived threat, decision makers must be careful. The Sino-Soviet crisis and the Cyprus crisis were not picked up

by the cusp catastrophe. Again this may be due to the limited US and USSR dyadic involvement in these crises.

For the year 1968, the cusp catastrophe picks up two movements which can be considered crises — from January to February and from June to July. The January-February movement may reflect either the seizure of the Pueblo or the Israeli-Jordan crisis. Our reliance on temporal movement provides no sure way of defining which crisis was picked up by the model. Since the movement is one of high threat and uncertainty, we suspect that the Pueblo crisis triggered this movement. This is because Pueblo seems to be a 'classical crisis' like the Cuban-missile crisis which conforms to the notion of crisis as a situation described by C. Hermann (1969). The June to July movement reflects the beginning of Soviet intervention in Czechoslovakia. It appears that movement for the year 1968 as depicted by the cusp model has corresponded to all the crisis movements according to our list from the other sources.

The year 1969 shows no crisis according to the cusp model while two crises were depicted by other sources — the Mideast crisis occurred between February and April, while the Sino-Soviet clash occurred between March and April. Both crises depicted by the sources occur in the first-third of the year. According to our data little movement occurred at this time.

The cusp model shows two crises occurring in 1970, one occurring in January-February of that year, and the second occurring between December 1970 and January 1971. The first crisis corresponds to the Israeli-UAR crisis, while the second corresponds to the civil war in Cambodia. The Middle-east crisis moves from a high threat to a low threat situation, much like its predecessor in 1967; while Cambodia reflects the more accepted definition of a crisis situation.

One crisis occurs in 1971. It occurs in December of 1971 and corresponds to the problems in Bangladesh. The year 1971 shows the largest degree of movement of all the years, yet only one crisis is depicted. This provides further evidence that our definition of crisis is NOT very dependent on our use of Z scores.

The next two years — 1972 and 1973 — show no crises using the cusp model. It failed to pick up what clearly is a major crisis — the Mideast. In 1974 the cusp model depicts a single crisis occurring between July and August, which corresponds to the Cyprus crisis. In 1975 a crisis is depicted between May and June which corresponds to the Mayaguez crisis.

These results are promising. The cusp model seems to have a perfect score in the elimination of false alarms. In NO circumstances depicted by the cusp model do the other sources say a crisis does NOT occur. The model does not fare as well on depicting all the crises in our compiled list. The model with its usage of a mathematical construction places rather stringent requirements on a definition of crisis. It does not allow simple co-variation of threat with uncertainty. Rather,

it is built on the assumptions that: (1) there is movement in the control space; (2) that in a pre-crisis period behavior is primarily cooperative; (3) that threat has to cross a threshold (zero) and must become high; and (4) that uncertainties scored on a standardized scale must be such that it meets the following requirement

$$Un > \frac{\sqrt{-4} th^3}{27}$$

These are more stringent requirements than would be necessary in an analysis which sought only to find those periods when there is high uncertainty and high threat. It is probably due to the above characteristics that the model might be characterized as limiting the number of false alarms. This eliminating false alarms may have desensitized the definition to such a degree that we may be ignoring important situations which might be considered crises. This is clearly the case with the Mid-East crisis of 1973.

There is an important qualification to these results. Due to the use of monthly aggregates, we do not get a time reading of the path of movement between months. We have assumed that the movement between two months occurs in a straight line. This clearly is an oversimplification. Only with work in smaller increments can this assumption be tested.

F. Conclusion

Two things are apparent from this analysis. First, the cusp catastrophe model has some validity as a model in the definition of international crisis. The model appears to have a strong discriminating capability. Since the model has a perfect record in not formulating any "false alarms" it is important to continue to develop its applicability as a research tool. This development can be on two levels. On one level, it seems we can extend the control surface and the behavior surface. We have begun work in this direction by dealing with the theoretical implications of adding another control variable — decision time, as well as another behavior variable — operational preparedness in our earlier theoretical discussions.

On another level, it seems necessary to retest the cusp model empirically, as well as test the more complex elliptic umbilic model with more variables. But in order to do this, it would be necessary to use a different data source. We would have to use a source that does not aggregate on a temporal domain. This will allow for an empirical test of the applicability of the perturbation assumption of the catastrophe model. That is, that small incremental changes may lead us into sudden transitions.

The data source envisioned for such a test will have to deal with organizational perceptions. This follows from our assumption that perceptions map onto behavior. Such a data source is available and has been discussed at some lengths in Chapters IV, V and VI.

The second important aspect of this study is that the crisis initiation process appears to be a highly complex phenomenon. There is no clear type of movement that demarcates a move into a crisis. Crisis occurs when threat is increasing (the Pueblo incident) as well as decreasing (Arab-Israeli crisis of 1967). These results will limit the development of any dynamic system perspective using the catastrophe model. There is no clear force field which depicts movement on the surface which would provide a characteristic function demarcating crisis as a dynamic function. This means that there is no clear deterministic explanation about how from a particular point in time a crisis will occur. The preliminary data seems to indicate that it will not be possible to define the amount of time required to move from a particular point on the control surface to a crisis. This time characteristic would have been possible only if a force field depicting perceptual movement could be defined.

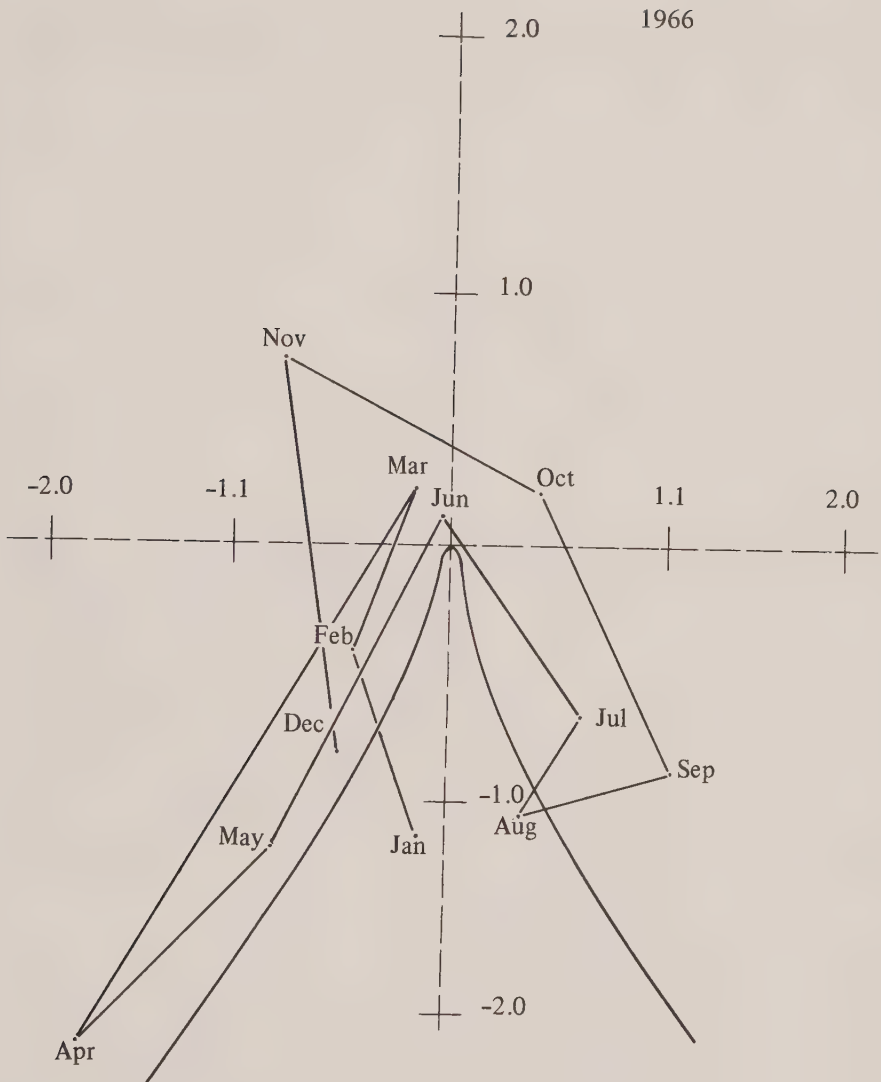
What this implies is that we should drop down a level in our analysis. We need a clear understanding of those organizational elements that make up an actor's perception of its outer environment. If we can find some underlying mechanisms that explain an actor's perceptions of threat, decision time, and uncertainty, we will begin to get a glimpse at the important outer environment — inner environment interface relationship.

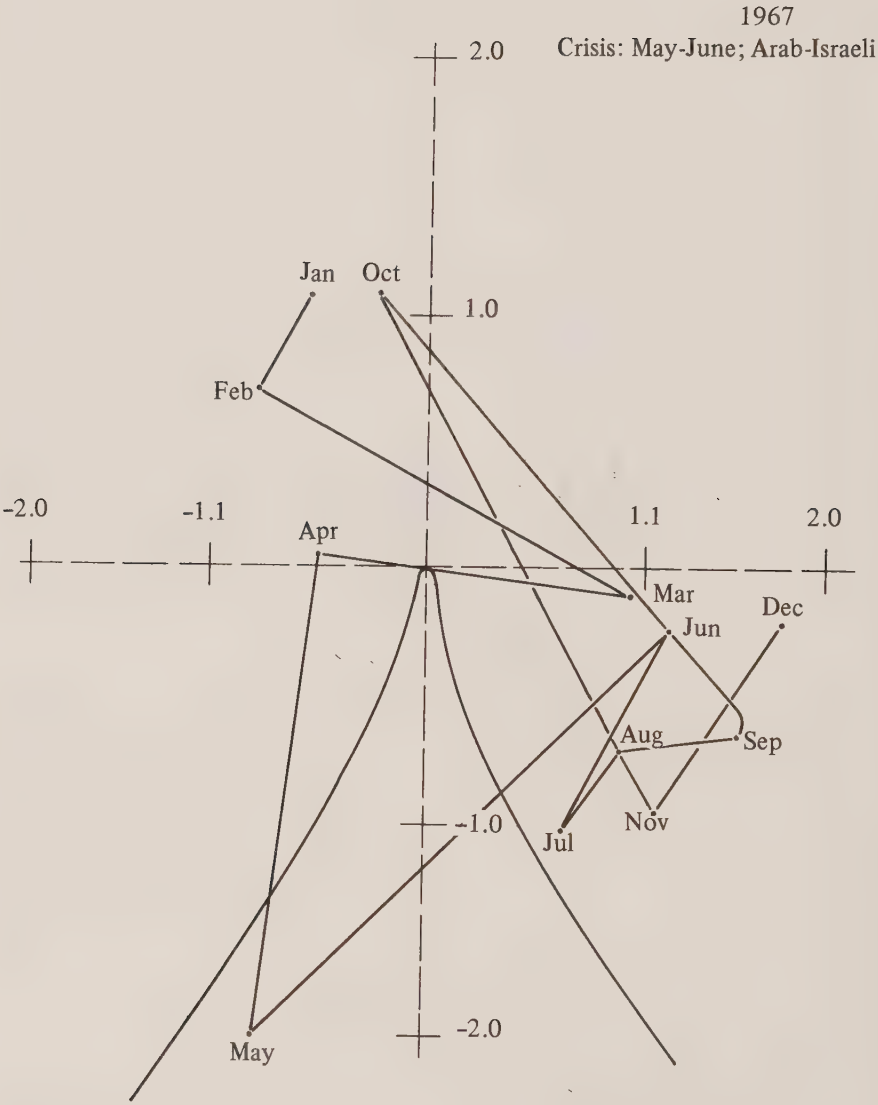
The catastrophe model has moved us in two directions. It has provided incentives for an investigation into the dynamics of organizational perceptions. It has also shown itself to be a fairly good model in the demarcation of crises and clearly warrants further development and investigation.

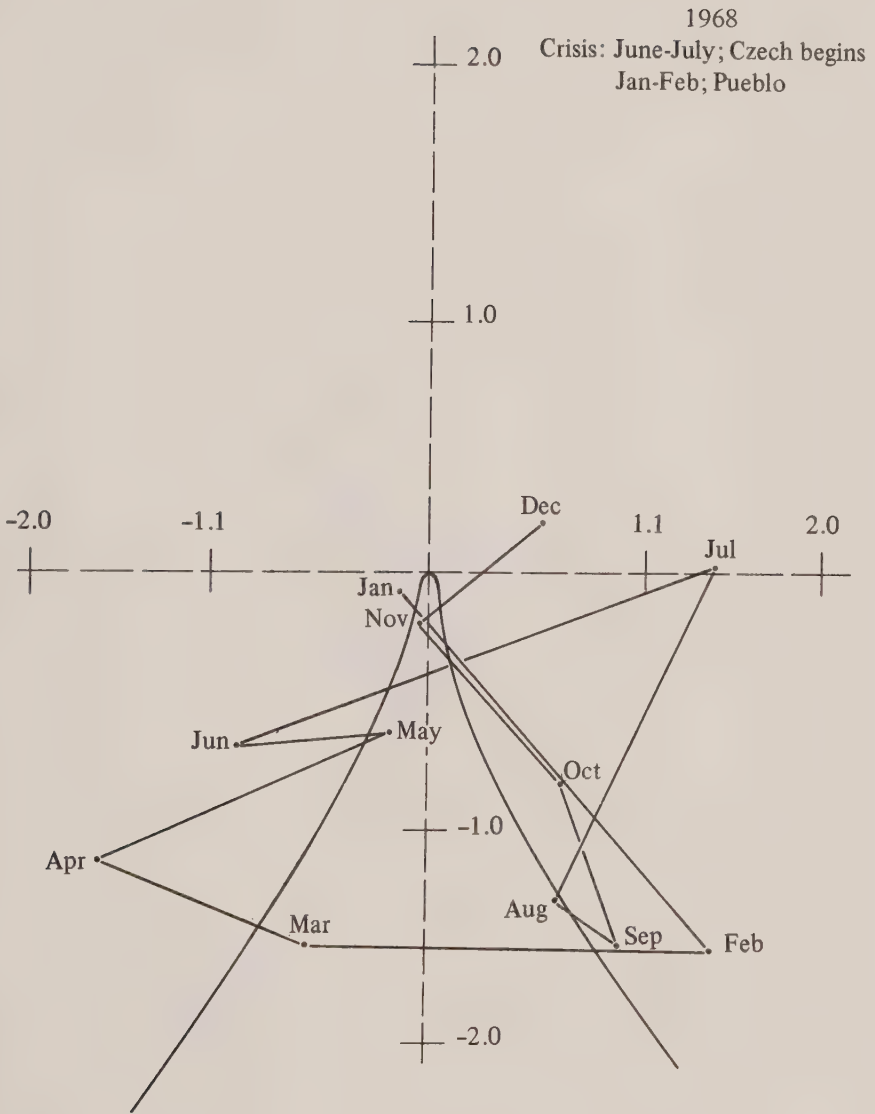
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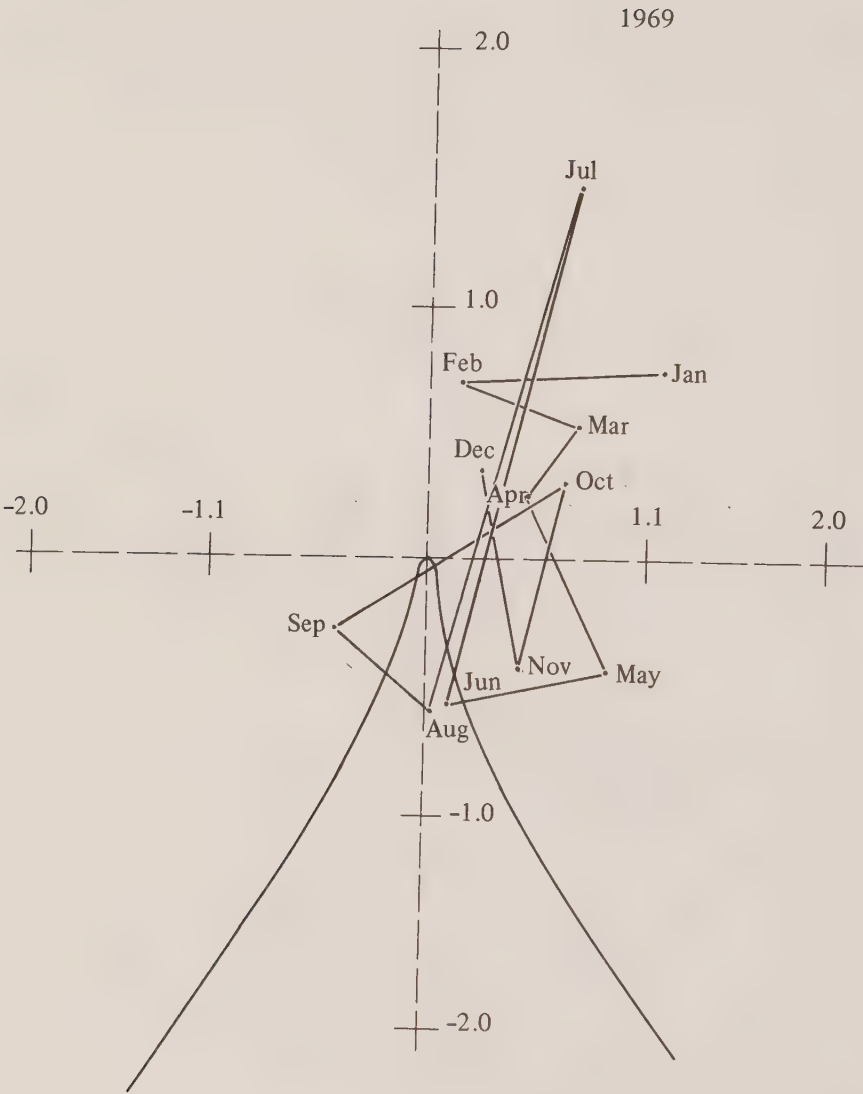
1. From *Winnie-the-Pooh* by A. A. Milne. Copyright, 1926, by E. P. Dutton & Co., Inc. Renewal copyright, 1954, by A. A. Milne. Reprinted by permission of the publisher, E.P. Dutton, Inc.
2. A look at the dispersion of the measures, will show there is probably a low auto-correlation process due to the high variance in the measures.

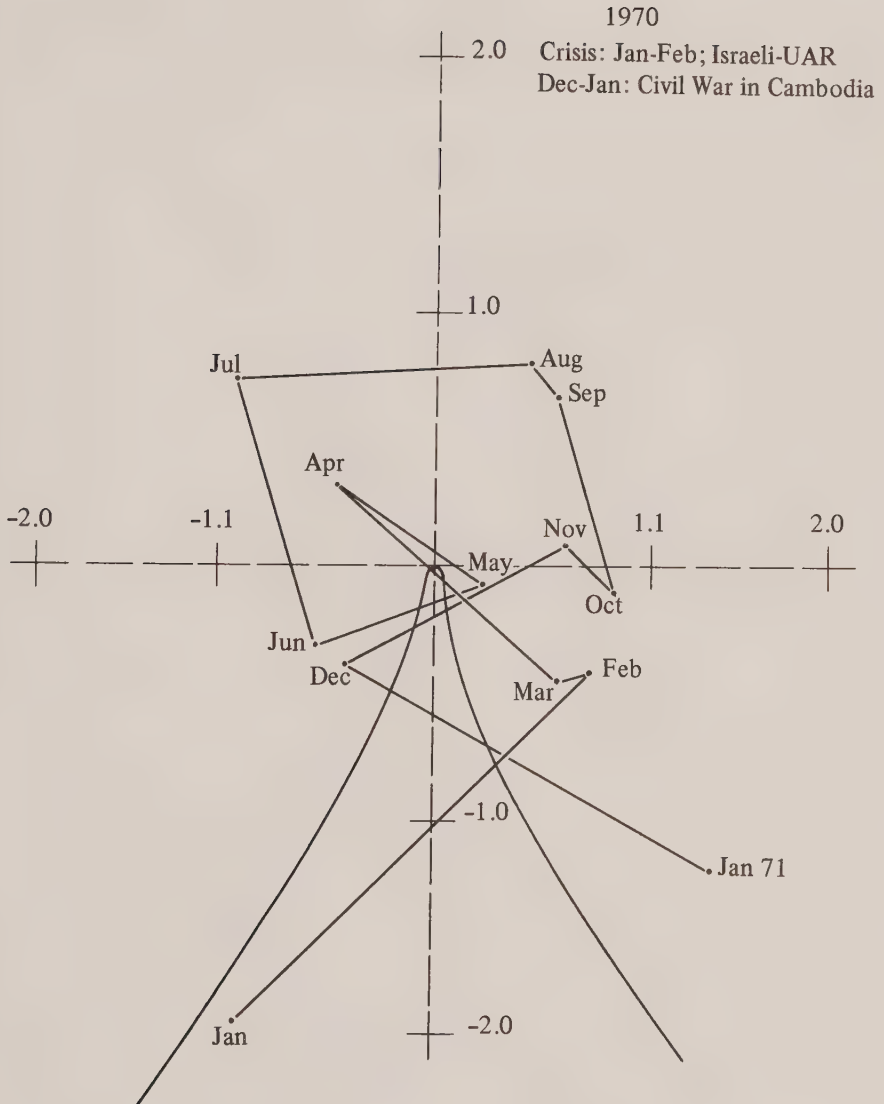
Appendix
Monthly Movement in Control Space
Depicting International Crises



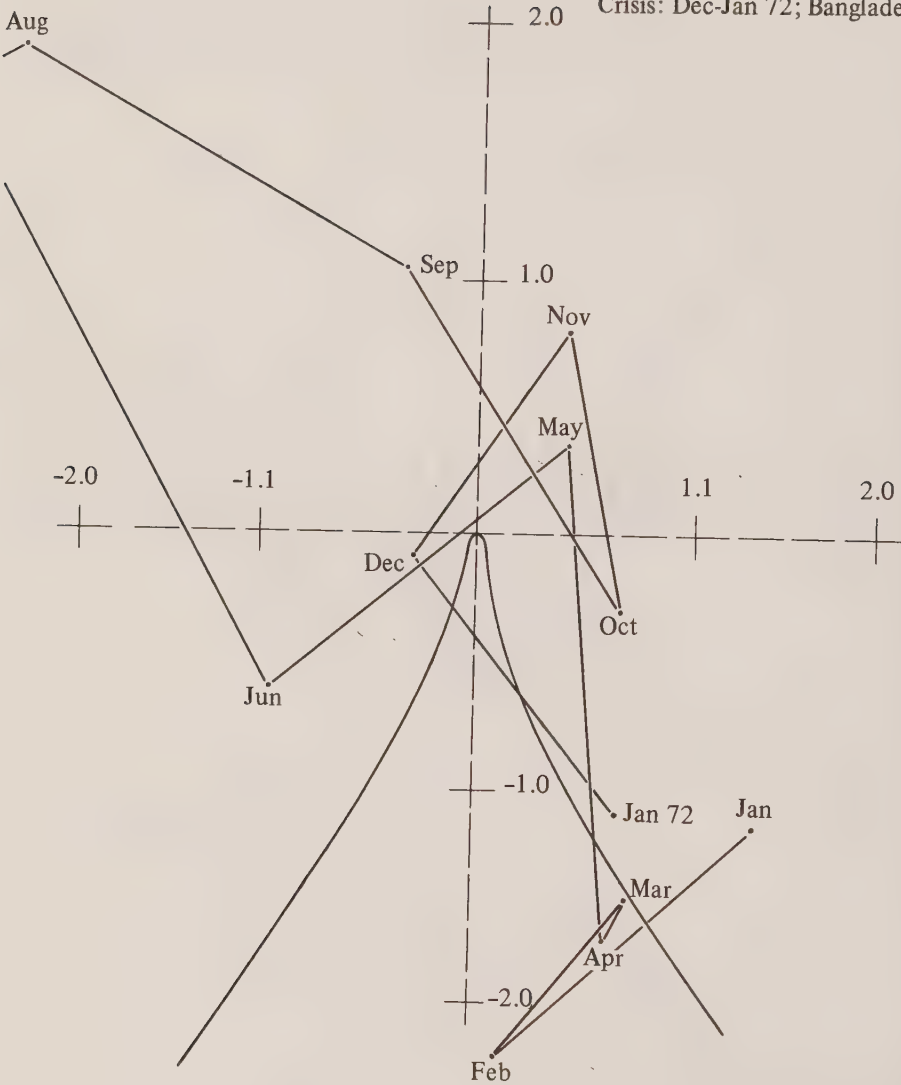




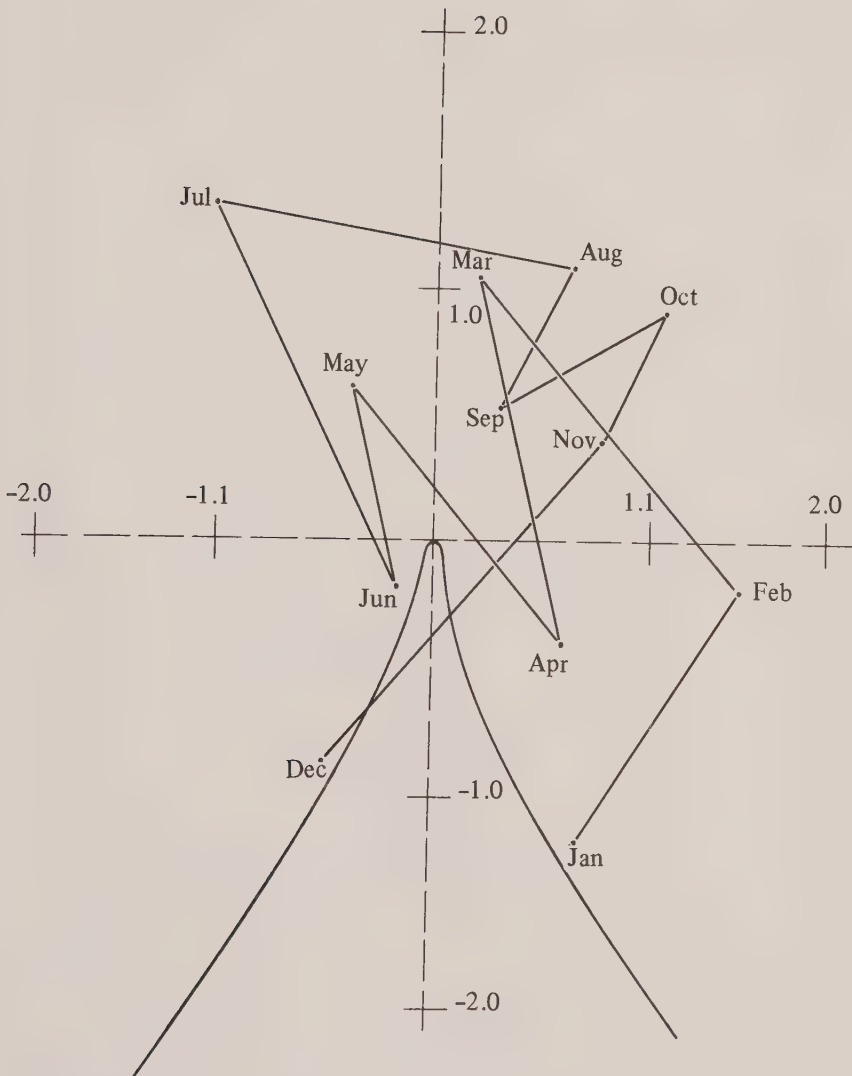


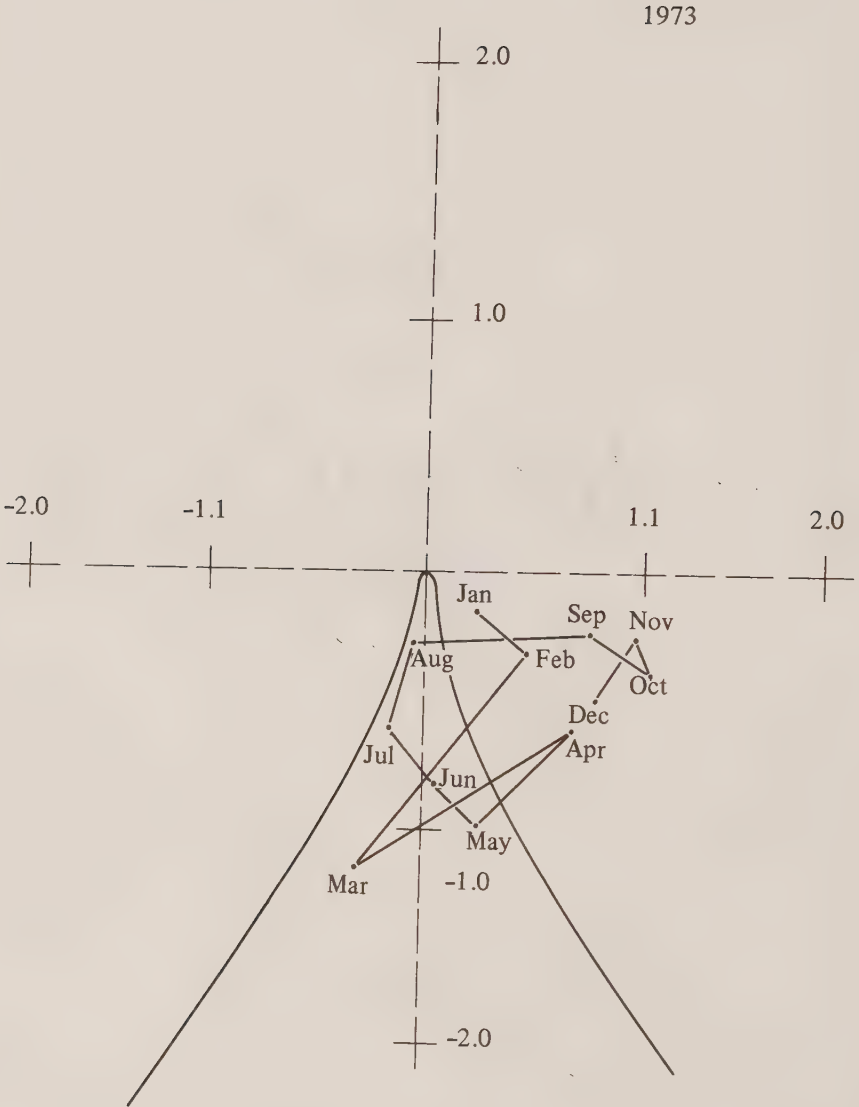


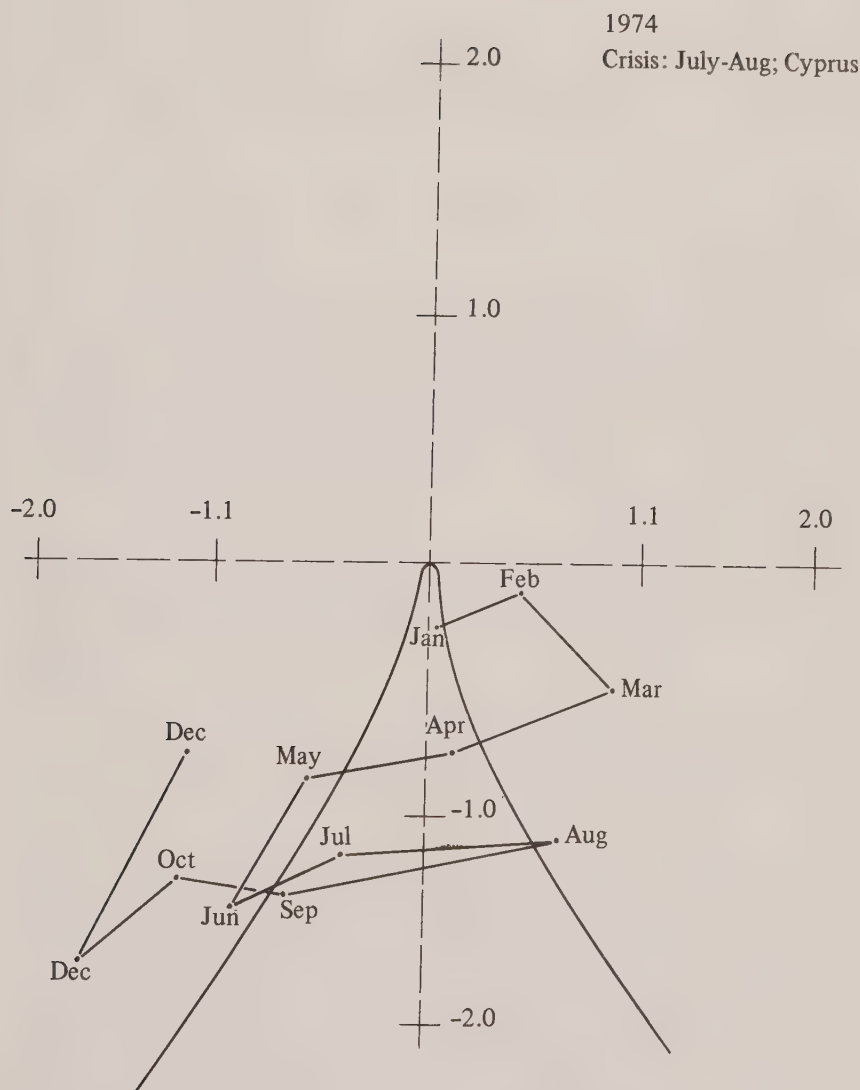
1971
Crisis: Dec-Jan 72; Bangladesh



1972







Chapter IX

The Crises of the 1960's

A. Introduction

In this chapter we will equate each of the thirty-six crisis situations with the type of behavior reflected in the foreign policy system. There are a number of ways this can be done. One could correlate the movement of the perceptual variables with a behavioral continuum. Such a technique, however, presupposes a simplistic linear relationship between the variables involved. Our analysis in the earlier chapters on perception suggests that the relationship between perceptions and behavior is more complex than the simple linear model underlying most statistical approaches.

Given both our earlier results and our commitment to the development of a formal model of crisis warning, the cusp catastrophe model of international crises was examined through a simulation. Combining both the perceptual output and the mathematics of a cusp catastrophe, a model was designed which provides a description of the day-to-day behavior of each of the three foreign policy agencies. This output was then compared to historical descriptions of the crises in order to investigate the validity of the model.

Given this approach we are able to incorporate several important elements of the foreign policy system. First, by relying on our earlier data we can incorporate movement that occurs in the international environment of an actor. Second, by transforming this movement into perceptual variables an agency's image of its environment can be discerned. Third, by predicting behavior of each agency via our theory, the validity of our total approach can be evaluated.

While the catastrophe model can best be considered a forcing function or black box model of the transformation of perceptions into behavior, it still provides us with an explicit transformation process. It allows us to combine those series of hypotheses about foreign policy behavior delineated in the earlier chapters (e.g. when threat is high, and uncertainty moves from low to high, there will be a crisis) into a larger working model of alternative foreign policy actions. While catastrophe theory does not provide an explicit explanation for the type of behavior formulated by the system, when combined with our substantive axioms, it does provide an explicit map of the state of behavior the system

should be in, given specific perceptions. The crisis perception model is an example of what happens in the foreign policy system. Its validity can be tested empirically.

This point is at the heart of the criticism of catastrophe theory presented by Hector Sussman and Raphael Zahler (1978). In criticizing earlier work done by Zeeman (1974) which explained how the cusp catastrophe model works, Sussman and Zahler argue:

"What the 'theory' does is, at best, *restate* the fact that there are (stock market) crashes, not *account* for it. The fact that sudden jumps occur is a part of the assumptions, so that the theory's 'account of these jumps' is simply, that 'there are jumps because there are jumps', which is hardly a contribution to our understanding." (1978, pp. 133-134; italics is original)

The reason that the Zeeman piece did not help contribute to our understanding of stock market crashes was that it did not go beyond mere description of a potential analogy between the catastrophe model and an aspect of social behavior. Zeeman's usage of a step-function to describe a crash is so intuitively correct, Sussman and Zahler see it as trivial.

Yet, the Zeeman piece is definitely not worthless. It simply does not go far enough for Sussman and Zahler. While Zeeman was content with developing a model, Sussman and Zahler require the testing of the model. Further, the testing should provide new insights which can account for certain types of social behavior. Sussman and Zahler, then, are not content simply with descriptive analysis. A mathematical model should go beyond description and provide explanation.

Clearly Sussman and Zahler are correct. At the heart of any science is the need for explanation. Nevertheless, explanation is built upon description. Without a clear understanding of phenomena our explanations can at best be so cumbersome that they violate any attempt at approaching a criterion of parsimony.

International crises are not like a stock-market crash. The plethora of definitions of international crisis is a clear indication of the lack of a consensus by scholars about the facts that make-up crises. It was our intention in earlier chapters to provide an intuitive description of crisis using the catastrophe model. This chapter is an attempt to refine those ideas and to place them within a larger model. Finally, we will attempt to provide some validity to the model by comparing it with other source accounts of crises. By placing the "trivial" output generating function of catastrophe theory into a real social theory of crises, we have gone far to answer Sussman and Zahler. By submitting the theory to empirical analysis, we will have completed the transformation of an analytic a priori statement into a synthetic aposterior world.

B. Research Design

In order to determine the type of behavior which each of the foreign policy agencies might exhibit in a crisis, we developed a simulation using the cusp catastrophe model. Threat and uncertainty were chosen as the perceptual variables which would act as the input to the model. The behavior variable was defined as operational preparedness. The model assumes that the perceptual variables determine the behavior of an agency. In statistical terms, threat and uncertainty are the exogenous variables while the operational preparedness is the endogenous variable of the model.

As has been explained in earlier chapters the perceptual variables of the model were developed using WEIS data and a weighting matrix which reflected an agency's image. The final variable in our calculus — the behavior variable — will be determined by taking the parameters for behavior inserting them into equation one and solving for the root of the equation.

$$\eta = x^3 + thx + un \quad (1)$$

In equation (1) η is the behavior surface. x is the behavior variable. th is the threat variable and un is the uncertainty variable. By setting equation one equal to zero the problem of finding a solution for the root structure of the equation is a minimization problem.

Treating equation (1) as a root problem created a number of implications. First, since the degree of the equation was odd, the number of roots in the equation likewise had to be odd. This creates no problems when one is dealing in that part of the control space where behavior is designated by the catastrophe model as unimodal (quadrants 1 and 2). However, in the area of the model in which bimodal behavior is designated, it does create problems. Rather than having two roots that describe the mode of behavior of the system, solving the equations provided three roots. These three roots correspond to the three points in Figure 9.1 that make up the S-configuration of the cusp surface. We, however, are only interested in the minima and the maxima.

As explained by Zeeman (1976) the third value is of no importance in defining the step-function process that lies at the heart of catastrophe theory. In order to resolve this inconsistency the behavior (x) was assumed to follow the delay rule. As the simulation was run, each day's behavioral output was printed. On those days when multiple roots were found as a result of the structure of the equation, all three were printed. It was assumed in reading the output that the mode of behavior advocated on a day with multiple roots was the behavior which most closely corresponded to the previous days behavior.¹ (This follows Zeeman and Isnard's definition of a delay rule. 1972).

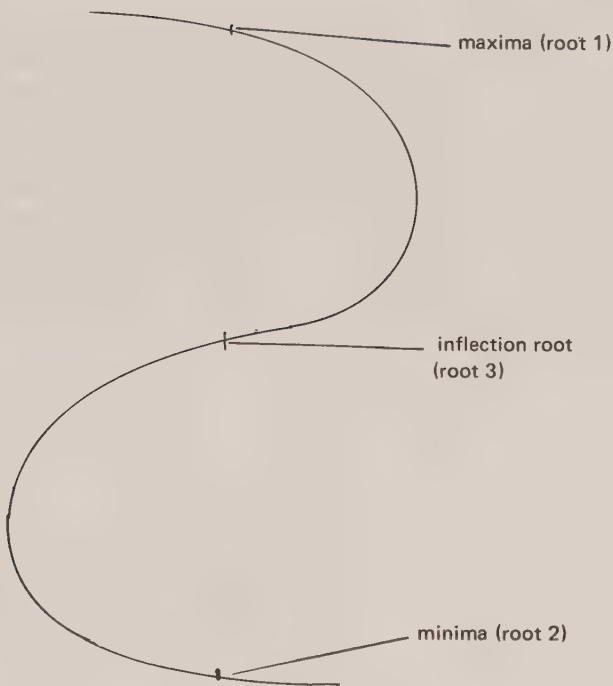


FIGURE 9.1

ROOT STRUCTURE WITHIN THE CUSP

The output of multiple roots provided important information as well as the dilemma of determining the behavior advocated. The multiple roots provided a delineation of the cusp area. One might think of the cusp area as an early warning area. As the number of roots changes from one to many, the system is approaching a critical point. The cusp area reflects those high stress areas which are close to crossing the line and designate abrupt shifts in behavior. Movement across this area leading to shifts in behavioral response might closely correspond to those constructs of crisis which define it as the tense period leading to an all-out conflict (see for example, the Stanford Studies on the 1914 crisis). Movement into this area without such shifts in behavior corresponds to those definitions of crisis, which view crisis as a tense short-term period which is just short of war.² Finally, shift may occur when there is such a relatively large movement on the uncertainty measure that it moves from one unimodal side of the cusp to the other unimodal side. This would adhere to any conception of crisis which views step-function change as the concept primary aspect. Terrorist activity treated as a crisis fits this category the best.

This definition of the root structure in relation to the control surface can be seen in Figure 9.2. The transformation surface η is mapped onto the control surface in this figure. The most important aspect of this figure is the cusp area. The cusp area is the only area with multiple roots. It is because of these multiple roots that we have designated the cusp area and early warning area. It is a warning area because the *potential* for the development of new and alternative action becomes available when a foreign policy actor is located in this area. In particular, there are two important operational positions which are permissible, but due to the delay rule a single option is chosen. The remaining part of the space contains a single root which corresponds to the behavioral output advocated by the model.

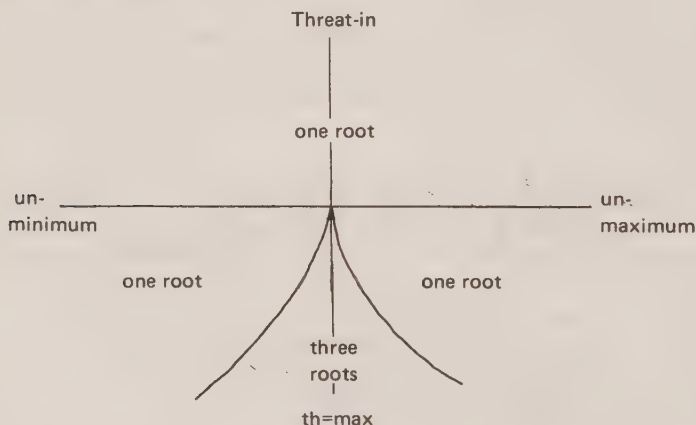


FIGURE 9.2

NUMBER OF ROOTS (BEHAVIOR VALUES)
MAPPED ONTO CONTROL SURFACE

Our choice of behavior variables for this analysis is an attempt to analyze what Belden (1977) calls a decision staircase. An objective of any intelligence and warning system is to determine where on the staircase of preparedness the nation ought to be at any point in time. Belden lays out a schematic (Figure 2.3) for discussing this position. We are modifying Belden's position to fit more precisely what we have shown to be the perceptual nature of crisis situations. Figure 9.3 depicts this relationship. The shift in implications is important but quite consistent with Belden's insightful commentary. First, we have replaced time with the explanatory variables of the shift in preparedness. Second, we have accounted for what appears to be dramatic shifts in the size of the steps in the latter. In describing actual crisis, Belden varies the size of the steps to reflect sudden shifts in the level of preparedness. In order to reflect and describe these

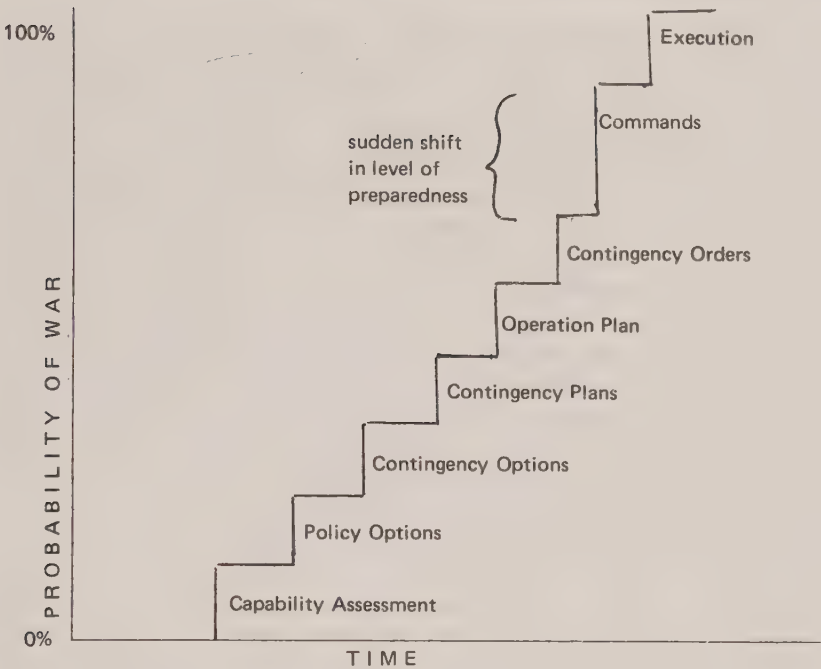


FIGURE 9.3

SUDDEN SHIFTS IN PREPAREDNESS

Adapted from Belden, *ISQ*, 1977.

shifts accurately, the mathematics of the cusp catastrophe were used. The actual jumps come as one moves up the staircase of preparedness and is a function of the current amount of threat and of shifts in the level of uncertainty. These critical points are dependent upon signals from the environment *and* agency images of the meaning of opponent's actions.

The major obstacle that had to be overcome was operationally defining each of the variables in the model. In order for the mechanics of the step-function to work a threshold point for threat and uncertainty had to be specified. After much debate, it was decided that the most valid test model would be to designate a priori the threshold point and then run the model to see if movement occurred in the cusp.

In order to do this, the first five days of each crises' perceptual data were collected. The mean was compiled for each of the perceptions and was designated as our zero or threshold point. Unlike the previous test of the catastrophe model, Z-scores were *not* calculated. In this test of day-to-day activity it

was not necessary to transform the space in any way since we were employing indicators with theoretically clear interpretations (see Chapter II) and a standard range. Using deviations from the mean would allow the threat and uncertainty scores to have both positive and negative values. These values would allow the model to produce the shifting quality of the catastrophe model.

The scale for the perceptual variables, as described earlier, ranged from zero to positive one. The use of the mean as a zero point did not substantially alter the interpretation of these scales. More importantly, the mean was compiled on data which only covered the first five days of each data set. In almost all cases, there was only moderate movement in the outer environment. These first few days of the data sets did not show substantial hostile behavior. This was important since we did not want to bias the scale either towards or away from hostile situations. Rather, we felt it was necessary to try to equate this zero point with "normal" behavioral activity. The concept of "normal" included both moderately hostile and moderate friendly acts.

Due to this conception of 'normal' we did not have to be concerned with the development of some ideal range on a scale (see Holt, *et al.*, 1978). The conceptions of total placidity versus total threat, total uncertainty and total certainty are outside our range of consideration. While the mathematics of catastrophe assume continuous and infinite space, our conceptualization defines a threshold and places limits on the range of our variables. While this stretches the mathematical assumptions involved, we viewed this study as a preliminary investigation which could only falsify the model. Sophistication of technique must await the rigors of applied mathematicians. We were primarily concerned with the implications for international relations and limited our efforts in the development of any sophisticated measurement process.³

We operationalized our measures of threat and uncertainty by subtracting this predetermined mean from the daily score on threat and uncertainty provided by the crisis perception model for each crisis. This resulted in the following input as the perceptual variables in equation are:

$$th' = th - \overline{th}$$

$$un' = un - \overline{un}$$

where

un' = input into manifold equation

th' = input into manifold equation

th = output from CPM

un = output from CPM

$\overline{th}$ = mean of perception for first five

$\overline{un}$ = days of all crises

Once these scores were compiled, equation (1) was solved to determine the number of real roots using a 'canned' program available at the UOM.⁴ The roots were printed along with the data and the altered threat and uncertainty scores. The data for each crisis are contained in a separate appendix available upon request. The degree of operational preparedness is designated by the roots in the minimization problem discussed in connection with equation (1). As the scores move up in magnitude, the nation's preparation for war is increased.

This technique provides scores on a behavioral dimension which reflects the amount of preparedness that each agency felt necessary at a given point in a crisis. The complexity of the model provides a great deal of information. First, given the structure of the cusp those situations which did and did not have an 'early warning' process could be determined. Second, the model for step-function could be examined. Third, the output information on which agency's behavior reflected either an early warning process or step-functional change in each crisis could be discerned. Finally, the degree or magnitude of the shift for each situation in which a step-function change occurred could be investigated.

C. The Results

To generate results the threat and uncertainty scores which had been generated in the exercises explained in Chapters V and VI for each agency were submitted to the routine for generating real roots from equation (1). Equation (1) was derived from our theoretical arguments in Chapter VII.

The early warning process

As noted previously, the root structure of the equation for the behavior manifold provides a definition of early warning. The cusp area can be thought of as a zone analogous to the red danger zone seen so frequently used on meters. This zone corresponds to the development of bimodal behavior. Whenever an agency's perceptions force it into the cusp area of the control surface, there are two modes of behavior which act as solutions to the equation defining behavior. It is only through the use of the "delay rule" construct that the behavior advocated by an agency is closely related to its existing behavior.

The "delay rule" might be analogous to bureaucratic inertia or similar notions which suggest that an agency will do today, what it did yesterday. Perhaps we might formalize the delay rule by saying that in this model it is a decision rule. A decision rule that comes into play when we have an option of two choices. The decision rule would be something like "If faced with a situation in which

two alternative modes of behavior are apparent, continue to go with the alternative most like the behavior you currently advocate" (i.e. stay on the surface of the manifold you were on).

This delay rule becomes important in defining our concept of step-function change. But it also hides the "early warning" quality of the cusp area of the model. Early warning occurs in the catastrophe model when the alternative mode of behavior appears. This is when perceptions move into the cusp area. It is when the question of shifting procedures is first introduced but not yet accepted. We are dealing with behavioral variables in this chapter and warning undoubtedly is related to decision making in a very formal way. Warning occurs when there is the potential for a large change in the mode of behavior. Warning occurs because there is some decision rule needed to decide upon a particular action.

This idea is at the heart of the perceptual approaches to crisis. If there is no clear warning, concern with issues like flexibility in behavior and clear understanding of the signals sent by another actor are irrelevant. Rather, concern shifts to questions about speed of mobilization and ability to control peripheral parts of one's defense system.

Table 9.1 presents a listing of those crises which have an early warning process reflected in their behavior. The table simply demarcates those situations that enter the cusp for at least one agency as opposed to those situations which do not reflect entrance into the cusp. This list does *not* deal with the step-function concept of crisis. It shows those situations that had multi-roots behavior for some agency on a single day versus those situations that have a single root. Situations in both columns may still meet the requirement of a step-function change which we have equated with crises.

Obviously, early warning is the rule rather than the exception in these situations. This result fits rather nicely with the results of Lentner's (1972) surveys regarding the amount of surprise involved in crises.

More importantly, a majority of the situations which do not have any early warning process seem to be influenced by State Department perceptions. That is, in a number of situations, the maximum threat is found in the State Department (see Table 5.7). In particular, India-Pakistan, Rhodesia, OPEC, and Israel-Jordan 66 all have the State Department as the most threatened agency. Substantively, this seems to suggest that when State is most threatened there may be no early-warning of a potential step-function change in behavior. The State Department with its emphasis on maintaining day-to-day operations may not consider divergent replies to behavior sent by another actor. If one accepts our earlier characterizations of State's image of the world as dealing with precedent and threat to the status quo, then these findings, that it tends to shift into an extreme crisis mode of operating without going through early warning, are not

TABLE 9.1
EARLY WARNING PROCESS IN CRISIS

<i>Situations with at Least one Agency entering Cusp</i>		<i>Situations where no Agency enters the Cusp</i>
<i>Early Warning</i>		<i>Surprise</i>
Arab-Israeli	Cyprus 74	India-Pakistan
Angola	Korea-US	Rhodesia
Bangladesh	Haiti	OPEC
Cambodia 73-74	Israel-UAR	Greece
Cambodia 74	Pueblo	Israel-Jordan 66
Cambodia 75	Jordan-Syria	Dominican Republic
Cyprus	Portugal	n = 6
Cuba	Trinidad	
Laos	Korea	
Saudi-PLO 72	Rhodesia-Sambia	
Israel-Jordan 67	Cambodia	
Jordan		
Turkey-US		
Hong Kong		
Sino-Soviet		
Lebanon-Israel		
Mid-East		
Vietnam		
Uganda-Tanzania		
n = 30		

N = 36

surprising. To the State Department, shifts in threat are combined with levels of uncertainty in such a way that there is very little delaying on the brink of a crisis. This was not a steadfast rule in the model, however. In most cases where the State Department perceives the maximum amount of threat, early warning does occur.

A listing of the crises in which agency(ies) entered the cusp area or which had a step-function like change is in order. By noting the number of agencies that show these two characteristics we can continue our investigation of the convergence of perceptions dealt with in an earlier chapter. This analysis determine

if the medium degree of correlation of the agencies will continue into the behavioral aspect of the model.

A number of crises show only a single agency moving into the early warning area — the cusp area — of the model (see Table 9.2). In Angola, Turkey-US, the Sino-Soviet situation and Hong Kong the CIA is the only agency which enters

TABLE 9.2
AGENCY ENTERING EARLY WARNING AREA (CUSP)

<i>CIA</i>	<i>State</i>	<i>Defense</i>	<i>Defense & State</i>
Sino-Soviet	Rhodesia-Zambia	Cyprus	Arab-Israel
Turkey-US	Jordan-Syria	Israel-Jordan	Saudi-PLO
Angola	n = 2	Laos	n = 2
Hong Kong		Korea	
n = 4		n = 4	
<i>Defense & CIA</i>	<i>CIA & State</i>		
N. Korea-US	Mid-East		
n = 1	Cyprus 74		
	n = 2		
<i>All Other Agencies</i>			
Cambodia			
Korea			
Bangladesh			
Jordan			
Lebanon-Israel			
Cambodia 74			
Cuba			
Vietnam			
Pueblo			
Cambodia 75			
Cambodia 73-74			
Uganda Tanzania			
Haiti			
Trinidad			
Israel-UAR			
n = 15			

the cusp area. Cyprus and Laos are the only situations in which Defense is the sole agency with any early warning while the Israel-Jordan situation in 1967 shows early warning only in the State Department.

These crises reflect substantive patterns. CIA involvement primarily occurs in those situations where there is direct Soviet or Chinese involvement. The one situation which is an exception to this pattern is the Turkey-US situation. Defense early warning occurs most frequently in areas where there is extensive previous Defense involvement. The Mediterranean and Indo-China saw extensive Defense involvement prior to these crises. State's sole involvement in the early warning process is in the Israel-Jordan situation and may reflect the diplomatic tact taken by Jordan in the Middle-East.

A majority of the crises show all three of the agencies entering the cusp area. Convergence in early warning seems to be a common pattern. This is primarily a result of using the same event streams for each of the agencies. While the same stimuli necessarily accounts for much of the convergence, it does not account for all of it. Image and its interplay are also important. This is indicated by the fact that there are situations where only a single agency shows signs of early warning.

There is apparently a clear need for alternative images in the early warning function of crisis management. In seven crises, only one agency triggered an early warning drill. This demonstrates a clear need for conferencing of watch officers in the advent of a perceived possibility of a crisis.

We can further classify this early warning process by looking at which agency enters the cusp area first. This provides a temporal gauge on which agency seems to be interested in particular geographical or functional areas. The classification based on this temporal distinction is found in Table 9.3.

The Lebanon-Israel situation and the Cambodian crisis of 1973 are the only two early warning situations in which all three agencies enter the early warning area on the same day. Since both of these crises occur in areas where there was conflict, these results are not surprising. One would expect each of the agencies to be keeping close tabs on unsettled areas like the Middle-East in 1968 and Cambodia in 1973. The difference in timing in which agencies see a clear-cut need for crisis preparedness suggests a clear need for convergence. We have previously demonstrated a correlation between agencies' perceptions of threat (Chapter VI). Here we have demonstrated that they are not always in phase when it comes to signalling an imminent crisis. This is not altogether disappointing since false alarms are indeed a frequent occurrence. But the opportunity of pushing the decision time back can frequently be achieved if conferencing between watch officers is studiously followed when any one of them think they see a crisis.

Judging from a majority of situations, the results show that the CIA is the first agency to enter the "early warning area" of the catastrophe model. This is

TABLE 9.3
FIRST AGENCY TO ENTER THE CUSP

<i>CIA</i>	<i>State</i>	<i>Defense</i>	<i>CIA & Defense</i>
Korea	Bangladesh	Cyprus	Cyprus 74
Cuba	Cambodia 75	Cambodia	Portugal
Jordan	Rhodesia-Zambia	Laos	n = 2
Mid-East	Cambodia 74	N. Korea-US	
Angola	Jordan-Syria	Israel-Jordan	
Hong Kong	Uganda-Tanzania	Korea	
Turkey-US	Israel-UAR	n = 6	<i>State & Defense</i>
Sino-Soviet	n = 7		Arab-Israeli
Cambodia 73-74			n = 1
Saudi-PLO			
Trinidad			
Haiti	<i>All Three Agencies Enter</i>		
n = 12	<i>Cusp on Same Day</i>		
	Lebanon-Israel		
	Pueblo		
	n = 2		
	N = 30		

a reflection of the agency image built into the model. The CIA was conceived as an agency concerned with long-term trends which might lead to disadvantageous disruptions in the international system for US interests. The CIA's emphasis on problems of domestic stability enables it to forewarn of pending crises earlier than the other agencies.

The Defense Department was the first agency to enter the early warning area in the Cyprus, Cambodia 1973-74, and Laoian situations. Again, we might credit Defense sensitivity to previous involvement. Cyprus appears to be the abnormality in this set of situations. Yet, the extensive US involvement in the Mediterranean probably allows this substantive argument to stand. Each of these situations shows substantial movement on those indicators weighted most heavily by the Defense Department. These indicators include: current unit capacity, military readiness and the military relations between x and y. They suggest that in situations where there is military build up or a high fighting capacity, the Defense Department is most likely to slip into an 'early warning' zone.

Those situations in which the State Department is the first agency to enter the early warning zone are characterized by the political and military dyadic indicators. Bangladesh, Saudi-PLO, Israel-Jordan, and Cambodia 1975 all reflect this pattern. Each show extensive movement on political relations between two nations as well as military relations. The distinction between these situations and the earlier Defense Department situation is that the military build up indicators do not play as decisive a role.

Throughout the formal development of the catastrophe model we have relied on the idea of a step-function change as a synonym for international crisis. This seemed reasonable as a result of both our literature reviews and the mechanics of the catastrophe model.

Sussman and Zahler (1978) raise an interesting question in their critique of catastrophe theory. They ask when a step-function change is actually a "non-trivial" change. In other words, when do discontinuities make substantive sense as well as topological sense? This is a serious question when one simply investigates the qualitative mathematics associated with the catastrophe model. Transformation of scales make large jumps seem small and small jumps seem large. Fortunately, when one moves out of the qualitative mathematics and determines a specific scale for a specific test, it becomes possible to operationalize large discontinuities. These operationalizations will be idiosyncratic to the research but if valid results ensue, it seems the characterization is worthwhile.⁵

Defining a threshold point for the control surface provides an early guide in demarcating step-function change from non-step-function change. According to Thom's geometric representation of the cusp, it is obvious that step-functional change occurs in quadrants 3 and 4 (see Figure 9.2). In these quadrants, depending on previous behavioral scores and parameters for the equation, a slight change in perception can trigger a modal (from negative to positive) change in behavior. In quadrants 1 and 2 for a similar change in behavior to occur, a significantly larger shift in the perceptions of an agency would be required.

Using this operationalization of a step-function change the model does very well. In only four situations: Bangladesh, the Sino-Soviet crisis, Cambodia (1973) and Lebanon-Israel are there no jumps in behavior. Two of these crises, Cambodia and Lebanon-Israel, fall into this category as a result of inconclusive evidence. Over the time period for these two crises a number of the agencies enter the cusp area but never come out of it. In the Cambodian crisis, this happens for all three agencies, while in Lebanon-Israel it happens for the CIA and State Department. In Lebanon-Israel the Defense Department enters the cusp area, but returns on the same side of its entrance. This indicates a warning process with no behavioral shift. For the other agencies regarding the Cambodian situation, the result are inconclusive since the data set ends within the cusp area. If the length of the data set was extended, a shift might be possible. Un-

fortunately, a shift does not appear to be likely, if we extended the time frame of the data set. This is because the time frames cover what a number of other sources define as crisis situations. Given the high degree of validity in a majority of the situations, extension of the data set would result in an exit on the 'peaceful' side of the cusp without any corresponding behavioral shift. Thus there are two crises which are characterized as important enough for early warning to have picked them up but nonetheless failed to develop to the point where radical shifts in US coverage or preparedness was required.

The other two crises which failed to show a behavioral shift are not a result of inconclusive findings. Rather, there simply is no shift for these crises over the time frames investigated. Substantively, there might be good reason for this. There is no historical evidence that the United States was directly involved in the Sino-Soviet border clash. Likewise, any US involvement in Bangladesh probably would not be reflected in a shift in behavior. This is because involvement was limited to things like relief to victims.

Limited reporting of events, in the Sino-Soviet cases, plays an important part for this lack of a shift. Movement on the surface would probably lead to a shift if more events were coded. This might occur simply as a result of the movement. Under-reporting might reduce the degree of uncertainty in the model. Given less events to code, there is a smaller degree of competing interpretations. This reduction in the probability of a large number of agency interpretations reduces our uncertainty. Furthermore, the shift aspect of the model postulates that shift occurs when uncertainty moves from low to high. The lack of coded events probably results in the model's inability to make this movement.

This explanation seems valid in both situations. In the Sino-Soviet situation the maximum number of changes in indicators is two, while in Bangladesh the maximum number is five. This low degree of change in the indicators combined with low uncertainty scores to show little lateral movement in these two situations. The result is the lack of any behavioral shift.

Step-function change

The final characteristics of the model to consider is the degree of shift in each agency's behavior. This shift reflects how drastic a change is instigated by each agency. The shift is primarily a function of the amount of threat in the system. As explained in earlier chapters, the degree of the shift is a function of the amount of threat. When threat is high the shift is large, when threat is low the shift is small. Uncertainty acts on triggering shift. The amount of uncertainty which determines a shift can be found by eliminating the behavioral variable in equation one (see Chapter VII).

This model yields a majority of situations in which all three foreign policy agencies showed step-function change. Step-function change is not only a shift that results from traveling through the cusp area of the catastrophe model, it includes movement from the third to the fourth quadrant of the control space which crosses both bifurcation lines.

In most of the crises investigated there was considerable movement in the third and fourth quadrants of the model. In most cases behavior moved into and then withdrew from the cusp on the same side it entered. When step-function changes occurred in the model, it was usually a result of a change in uncertainty that moved the measure from the third to the fourth quadrant. The most straight-forward results would have shown all the crises entering the cusp area from quadrant 3, lingering with this area for a few days, then leaving the cusp with a step-function change in the fourth quadrant. Most crises are more complex than this. Agencies enter and leave the cusp area, providing a warning of danger, from quadrant 3. Then an unexpected event will reduce the certainty of an agency's interpretation and a step-function change ensues. The agencies are "warned" since they have entered the cusp area. But this warning might be equated simply with an increase in stress. The stress exists and then is reduced. But, then, an unexpected move increases the stress to such a degree that a step-function change occurs.

In most cases, this undulating process of warning, slight relief, and change occurs within all three agencies. In a few crises the step-function change only occurs within one or two agencies.

Step-function change occurs solely in the CIA in the Hong Kong crisis, the Cambodia 1973-74 crisis, and the Dominican Republic. State was the sole agency with step-function change in the Israeli-Jordan situation. The Defense Department was the only agency that showed step-functional change in Korea, Bangladesh, India, Pakistan and Laos. The Cuban crisis was identified by jumps in both the State and Defense Departments.

There were additional situations in which all three agencies exhibited step-function change. There were four crises which showed the behavioral characteristics of step-function change in preparedness (that is, they moved from a positive to a negative value) but upon investigation, the drastic shift was the result of a sudden and dramatic shift in the uncertainty variable for the actors. While these shifts do not merit falling under a strict definition of crisis, they should be considered quasi-crises. This is because the transition from cooperative to conflictual behavior is just as swift as the step-function process. The difference lies in how the change takes place. In these quasi-crises, the results are not a function of a delay rule. Rather they result as a function of the quick increase in uncertainty. These crises do show behavioral shifts. Thus in these

crises one would expect a linear relation between operational preparedness and uncertainty while in the other 30 crises there is a much more complex relationship. Operational procedures are resistant to change, finally giving way in dramatic shifts which do not reflect a simple one to one correspondence to uncertainty. A threshold must be crossed which unleashes a strong change. How striking is the shift? How delayed is it? The answer to these questions is found in threat. The higher the threat the larger the change in uncertainty necessary to trigger a shift in procedures.

In four cases, however, there was little threat. The situation never really fell into quadrant 3 and 4, but the shift in uncertainty was severe! In these cases, according to equation #1, Chapter VII, drastic shifts in behavior can only occur in conjunction with drastic shifts in uncertainty.

The dynamics of perception result in step-function change in the behavior of each of the agencies. We will explore some of the characteristics of these jumps. First, the order in which the agencies show the step-function change will be investigated. Table 9.4 presents the ordering for those crises with multiple agency step-function change. There are very few instances when all of the agencies exhibit the step-function change on the same day.

Rather, each agency seems to show a step-function change on a different day. In a large number of cases the CIA seems to be the first agency that undergoes the shift. In those situations when the CIA does not show the step-function change first, it is the State Department which shows the initial change. In no situation is the Defense Department the first agency to react to its outer environment by a step-function change. In fact, in some instances the Defense Department does not show step-function change for two months after the other agencies show the change (Jordan). In most cases, however, the Defense Department shift in behavior is much closer to the other agencies.

When the agencies do shift the range of the shift varies between one and two points. This can be compared to the quasi-crisis situations in which behavior shows qualitative change (values go from a positive to a negative number) but the shift is between .2 and .56 of a point. This result shows that the model is able to distinguish between those changes associated with the drastic changes in uncertainty (quasi-crisis) and those changes which occur when an agency crosses the bifurcation line of the cusp.⁶

Several conclusions can be drawn from this chapter. First we have increased the level of confidence about the catastrophe forcing function when it is placed within the theoretical perspective of Chapter VII. In the 36 crises identified in other substantive writings, 30 situations exhibited, the classic 3 root solution of the cusp catastrophe model. In only two of the 36 cases was a step-function in the operational preparedness levels of the agencies not called for. In the two cases which showed no response to crises, the Sino-Soviet border clash and

TABLE 9.4
FIRST AGENCY TO SHOW STEP-FUNCTIONAL CHANGE

<i>CIA</i>	<i>State</i>	<i>Defense</i>
Cambodia 75	Cyprus 1	Laos
Angola	India-Pakistan*	Cyprus
Mid-East	Israel-Jordan	Korea
Israel-Jordan 1	Rhodesia-Zambia	Bangladesh
Greece*	Saudi-PLO	Arab-Israeli
Cambodia	Jordan-Syria	n = 5
N. Korea-US	n = 6	<i>All Three</i>
Cambodia 74		Portugal
Hong Kong	<i>State and Defense</i>	
Turkey-US	Cuba	n = 1
Jordan	Vietnam	
Dominican Republic	Uganda-Tanzania	<i>No Shift</i>
OPEC*	Pueblo	Lebanon-Israel
Rhodesia*	Israel-UAR	Sino-Soviet
Cambodia 73-74	n = 5	n = 2
Trinidad		
Haiti		
n = 17	N = 36	

*Quasi-crisis

Bangladesh, it is questionable that shifts in preparedness would have been picked up given the lack of reporting in *The New York Times*.

Turning from theory testing to substance, the results highlight the role of the CIA in early warning. That agency's image creates a clear tendency to see farther down the road than either State or Defense images. State Department images in early warning are more inclined to be surprised. They are more likely to jump from day-to-day procedures into full fledged crisis mode. After correlating these findings with earlier findings, it appears plausible that this tendency is due to excessive concerns with precedence in diplomacy and to protection of the diplomatic status quo.

Conferencing between early warning watch officers is strongly supported by the fact that several crises were forecast by only one agency.

Thus, while a President can anticipate some correlation between agencies on threat, decision time, and uncertainty estimates, he cannot expect agreement on

the underlying causes of the problem nor can he expect all agencies to provide him with equally timely advanced warning. Threat is contagious, regardless of who sees it first or whether they can all agree to the reason for it. This is the classic problem of crises demarcation.

Notes

1. A search process was used such that

$$x' = x_i(+)$$

$$\text{If } (x_i|t) - x'_{t-1} < (x_j - x'_{t-1}) < (x_k - x'_{t-1})$$

where x' is behavior chosen

$$x_i = \text{root one}$$

$$x_j = \text{root two}$$

$$x_k = \text{root three}$$

2. This means, however, that these periods would not reflect severe behavioral change on the part of an actor.
3. The results below seem to justify this position.
4. The program employed is found in the University of Maryland statistical-mathematics package. It uses the Newton-Raphson technique of solving for roots of an equation.
5. We are following closely the arguments of Suppes (1967) here that one's theory includes more than the analytic derivation but also all of the procedures in his/her empirical extension and testing.
6. These shifts under investigation are of a really large magnitude when compared to the amount of change in uncertainty which leads to them. The one point jump in the Israel-Jordan crisis, for example, is brought about by a .23 change in uncertainty.

Chapter X

The Nature of the Environment

The final area of investigation for our Crisis Perception Model attempts to provide information on the nature of the environment in which United States watch officers operate. Two basic questions are of concern here. One, has there consistently been a particular kind of setting in which the US finds itself prior to crises. Two, has this setting been changing over time? Answers to the first question will suggest a sharper focus for early warning signals. If there has been a shifting equilibrium in the environment of crisis initiation, then a clear understanding of the implications of various dynamics is imperative.

From the perspective developed in this research, it is improper to develop measures of the environment independent of watch officers' perceptions. As argued in earlier chapters, the national decision making hierarchy in foreign affairs does not receive undeciphered information from cable traffic or *The New York Times*. Attempts to code information from the environment without resort to analysts' images can provide researchers with invaluable information, but this information would rarely help in identifying governmental responses. Fortunately, the model developed here allows us to integrate signals and images in past crises. In the simple cusp catastrophe, a two-dimensional graph of the control surface is enough to chart shifts in the environment, *as seen by the agencies*.

In order to investigate these findings, we continued to use the behavioral variable output of the Crisis Perception Model. This is the same output as used in the preceding chapter (see Appendix to Chapter IX). The output provides both perceptual and behavioral information. The values for threat and uncertainty are the altered values:

$\begin{aligned} th &= th - \bar{th} \\ un &= un - \bar{un} \end{aligned}$	Where $\bar{th}$ and $\bar{un}$ are the mean for the sum of the first five days of all crises.
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These values determine the exact location within each quadrant that an agency is in on a specified day. Our analysis is primarily concerned with movement into each quadrant. This is because we are attempting to determine a general rather than a specific pattern of movement.

One of the most important aspects in analyzing implications of the model is to look at where each crisis period begins. That is, in what quadrant are the per-

ceptual variables located on the first day of the output. Remember that this point will be 30 days prior to the day experts designate as the start of the crisis. Perceptions of threat and uncertainty for this day should determine the nature of pre-crisis activity in this situation. It provides a base line. If the first day of a crisis situation is located in quadrant 1 (see Figure 10.1), then there is little threat and a high degree of uncertainty about the situation. This area is referred to as the stress area of the surface. If the first day of a crisis situation is located in quadrant 2, there is low threat and high uncertainty about a situation. This area is referred to as a peaceful area. Quadrant 3 represents those situations when threat is high, but there is a high degree of certainty. This is referred to as the poised area. In other words, an actor might be poised for attack in this area. Finally, quadrant 4 represents those situations where threat is high and uncertainty is high. This is a conflict area.

It should be noted that these descriptions of each of the quadrants provide the reader with a simplistic description of perceptions as they are related to behavior. Looking at specific points on the surface will generate much more specific information about the relation between perceptions and behavior. It should also be noted that part of quadrant 3 and part of quadrant 4 contain the cusp. In a previous chapter, this area was designated as the early warning area.

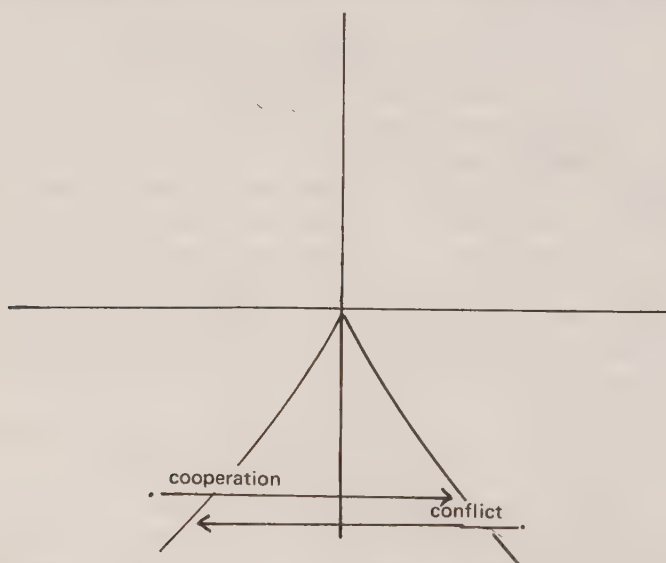


FIGURE 10.1

THE MAPPING OF DOMINANT BEHAVIOR IN CUSP
AREA IS DEPENDENT ON DIRECTION OF MOVEMENT

Early warning was invoked as a definition for this area because it provided a description of the potential multiple aspects of behavior. Since we are dealing with the specific mapping of perceptions onto behavior, this area might better be called the 'delay area.' It is a delay area because movement from the third (fourth) quadrant into this area does *not* correspond to a qualitative shift in behavior. The shift is delayed until there is movement *across* the cusp line. This complicates the description of the behavioral aspects of quadrants 3 and 4 (see Figure 10.1).

A description of the starting point for each of the crisis situations will help continue our description of the warning (or lack of a warning) process that the model represents. Table 10.1 provides a listing of the quadrant in which each crisis began. There are a number of important things to notice from this list.

TABLE 10.1
STARTING POINT FOR CRISES

<i>Quadrant 2</i>	<i>Quadrant 1</i>	
Saudi-PLO	Haiti	Israel-UAR
Laos	Jordan	Arab-Israeli
India-Pakistan*	Angola	Rhodesia-Zambia
OPEC**	Dominican-Republic	Pueblo
Uganda-Tanzania	Rhodesia	Lebanon-Israel*
Jordan-Syria	Mid-East	Cambodia 75
Dominican-Republic	Israel-Jordan 66	Cyprus 74
Korea	Israel-Jordan 67	Bangladesh
Rhodesia **	Cyprus	Cuba
Trinidad	Greece	India-Pakistan
	OPEC	Sino-Soviet
<i>Quadrant 3</i>	<i>Quadrant 4</i>	
Turkey-US	Cambodia (2) 73-74	
Portugal	Hong Kong	
	N. Korea-US	
	Lebanon-Israel	
	Cambodia 74	
	Cambodia	
	Sino-Soviet**	
	Vietnam	
	Israel-UAR*	

* State Department

**CIA

First, the agency which seems to be at odds with the two other agencies most frequently is the CIA. In a number of cases (Dominican-Republic, Angola, Israel-Jordan 67, OPEC), the reason for the divergence by the CIA is due to a higher degree of certainty. This fits most conceptions of the CIA — that of intelligence gathering and the forecasting of long-term trends. A number of cases show the CIA more threatened than the other agencies (Sino-Soviet, Rhodesia, and Cuba). This finding is more puzzling. There does not seem to be a common substantive thread running through this set of crises. Cuba is a seizure of US property situation, Rhodesia a naval blockade, and the Sino-Soviet situation a border clash. The only element that the CIA can be keying on in each of these situations is the emergence of hostile forces to the US.

In the India-Pakistan crisis, the State Department has a high degree of certainty, while in the Lebanon-Israel situation, the State Department has a lower degree of threat than the other agencies. In the remaining crises all of the agencies are located in the same quadrant.¹

A majority of the situations are located in quadrant 1. This corresponds to low threat, high uncertainty situations. The behavior advocated by agencies in this region could best be described as stressful. Values would reflect a mild degree of conflict. The behavior associated with this area of the model is on the same end of the continuum as the behavior in quadrant 4 but the dynamics associated with the model do not allow for the step-function change associated with quadrant 4.

In a majority of the situations, conflict is a normal expectation rather than an abnormality. This is important in any discussion of an early warning process. It seems that a majority of crises occur in those areas where conflict is a normal expected activity. This finding coincides with our earlier findings on perceptions as well as the work of Lentner (1972) on the lack of surprise in crisis situations. Information monitoring is probably a normal course of action in these situations. New information may not be necessary, but better information on existing situations is frequently called for.

What is surprising about these findings is that even those situations which were characterized by extremely quick actions — hostages taken, the destruction of US property — some degree of conflict was expected.

Since our empirical analysis of Chapters VIII and IX have demonstrated a good deal of correspondences between our model expectations and an empirical investigation of actual crises in the 1965-1975 period, we will extrapolate from them here. The pre-crisis environment in which the US found itself was primarily low threat, high uncertainty. This position is a somewhat classic characterization. The US has very little it need feel threatened about. On the other hand, anarchy reigns supreme in international affairs. Nations can do just about anything at any moment and any nation ought to feel uncertain about the immediate future.

The natural state of affairs was shattered at least thirty-six times in ten years. A quick review of the graphs in the previous chapter shows that crises which begin in the first quadrant take a zig zag route to cross the crisis thresholds in the bottom two quadrants. In all cases, however, an initial decrease in uncertainty accompanied by increased threat are required for all crises which began in quadrant 1. Just prior to the actual crisis, an increase in uncertainty is necessary to trigger crises. This chain of events is common, as we have shown in Chapters VIII and IX.

The few situations which have a starting point in quadrant 2 in which peaceful activity is the mode of behavior, are situations in which there was considerable military mobilization (PLO; Laos). These situations can be characterized as civil wars. Since these are civil situations, it may explain the initial behavioral mode determined by the model. That is, there are legal reasons for non-intervention into civil war. In addition, the political situation did not warrant hostile expectations. This is clearly the case in the PLO confrontation with its Arab allies (we must remember we are dealing with a pre-oil embargo situation). There is no apparent reason for US expectations of threat in a civil war between actors that seem to be adversaries of the US. Situations which are initiated from an environment at peace follow a simpler, more direct route to crises, there must be an increase in threat and a concomitant increase in uncertainty. These are the classic crises of Hermann's analysis (1969).

Very few crises began in quadrant 3, the high threat, low uncertainty quadrant. In this area, according to our model, behavior is basically peaceful but with the ever present potential for conflict. Nations enter the crisis early warning area by a small shift in uncertainty. Once in the cusp, behavior is attracted by two strong forces. The dominant force throughout quadrant 3 for situations of increasing uncertainty is the maintenance of current procedures. There is a reluctance to shift into a crisis mode. Earlier in Chapter VII we warned that this can create a situation in which behavior exceeds the ability of decision makers to control. In crises which start from quadrant 3, this is a real danger.

As the uncertainty pushes over into quadrant 4, there is an increasing pressure between the status quo force and the shift force. Here in this quadrant the force for change wins in a sudden 'lurch' of the system. Crisis behavior is called for. Nations must shift into crisis modes of operationalization and mobilization.

Several Middle-Eastern crises began in quadrant 4. From this quadrant the situation is in a long standing quasi-peace, quasi-war footing where the demarcation between peace and war is blurred. In classic catastrophe theory dynamics, the slightest of changes in the environment could result in drastic shifts in behavior. The suggestions of our theory do indeed correspond well with reality in the Middle-East.

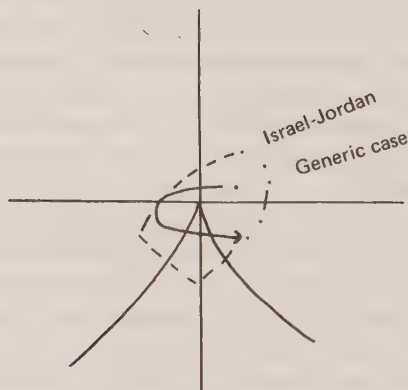
Given the starting points discussed above there is a particular pattern leading

to the step-function change we associate with crisis. It is clear that most crises begin in quadrant 1. It is also clear that there is a significant minority of crises from quadrant 4 which exhibit a definite blurring of the traditional peace and war continuum.

Looking at these situations which begin in quadrant 1, a number of characteristics emerge. First, most of the daily action occurs in this quadrant. While there is some movement out of quadrant 1, a substantial majority of daily events are located here. This occurs prior to and following those step-function changes that we have defined as crises.

Movement into quadrant 3 is very limited. If a crisis does move into quadrant 3, it has always been followed by a step-function change. In none of the situations which originate in quadrant 1 does an actor enter quadrant 3 and leave the quadrant through quadrant 2. A path of this type would correspond to a reduction in threat and a non-step function change would occur.

In a majority of the cases, movement goes from quadrant 1 to quadrant 3 to quadrant 4.² The shifts in perception seem to show an oscillating process going on. The dynamics suggest a movement from conflict to peace to conflict. In one situation, the dynamics traverses all four quadrants. In the Israel-Jordan crisis the Defense Department begins in quadrant 1 and circles the surface through each of the other quadrants. The predominant dynamics as well as the deviant case dynamics for those crises that have a starting position in quadrant 1 can be seen in Figure 10.2.



Solid Line = generic movement leading to a crisis.
Broken line = approximation of Israel-Jordan movement.

FIGURE 10.2

DEPICTION OF MOVEMENT FROM QUADRANT ONE INTO CRISIS

This type of dynamic suggests a pattern of interaction in which after a short hiatus threat is increased and uncertainty is decreased, and a strong positive relationship emerges between threat and uncertainty. One might note, however, that these descriptions are generalizations of the trends. There are a number of crises where more is going on than this simple flow. For example, there appears to be unvariable oscillation in almost all of the situations under study. That is, there is some movement from quadrant 1 to quadrant 2, back to quadrant 1, or from quadrant 1 to quadrant 4 and back. These oscillatory patterns graphically look like the movement found in Figure 10.3. The movement between quadrant 1 and quadrant 2 (A) is of some interest. If one simply looks at the behavioral output as an indicator of step-function change, movement from quadrant 1 to quadrant 2 and back shows the same characteristics as that between 3 and 4 with

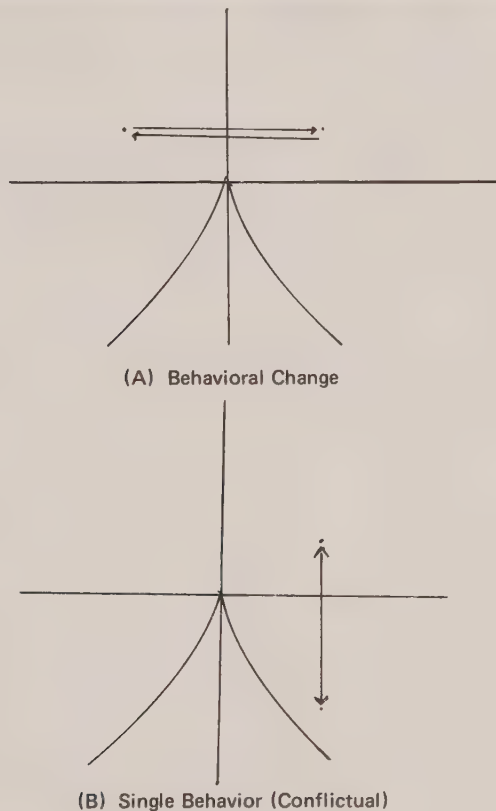


FIGURE 10.3

OSCILLATORY MOVEMENT ON THE CONTROL SURFACE

one exception. It requires a large movement of the uncertainty variable to get a divergent but sudden behavioral model in the one and two case. This is a characteristic which might be as important to our understanding of crises as the limited movement of uncertainty in quadrant 4 which signal step-function jumps. We might refer to the movement between quadrant 1 and quadrant 2 as a quasi-crisis when linear functions of behavior prevail.

Those situations which begin in quadrant 4 have a much simpler dynamic. They simply oscillate between quadrant 4 and quadrant 3. Again, the starting quadrant, is the quadrant that predominates. In most daily observations an actor from this group will be located in quadrant 4.

The only situation in this set of crises which does not follow the oscillating uncertainty pattern which is associated with the movement between quadrant 3 and quadrant 4 is Hong Kong. Hong Kong shows movement by both the CIA and Defense Department from quadrant 4 to quadrant 2 back to quadrant 4. Thus, there is a quick reduction of both threat and uncertainty followed by an equally quick increase of threat and uncertainty in this situation.

The Saudi-PLO situation which begins in quadrant 2 follows the dynamic associated with the OPEC situation described earlier. The Turkey-US situation simply follows the oscillatory dynamic of moving from quadrant 3 to quadrant 4 associated with those dynamic situations beginning in quadrant 4.

There are a number of implications which can be obtained from these results. First, a review of the dynamics suggests an oscillating dynamic in behavior. There in fact may not be a gradual build up to conflict. Rather conflictual behavior will precede and follow peaceful behavior. This seems to fit some earlier studies dealing with crisis delineation. In particular, McClelland (1968) has found that crises occur when there is a high H-rel score. H-rel is essentially a measure of the "variation or variety in signals." The higher the H-rel score the more difficult it is to pick the type of action sent by another actor. McClelland (1968) found that crisis situations show a high H-rel score (above .700). While we do not use the H-rel measure, the dynamics of the catastrophe model seem to indicate that this type of behavior is highly likely. The dynamics suggest that there will be a mix of behavior from conflictual to peaceful back to conflictual.

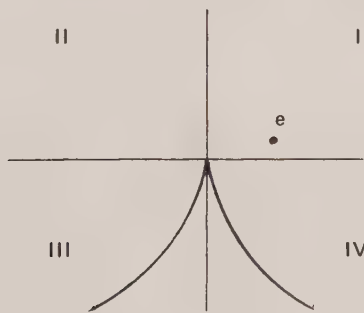
Further, the results suggest that it is the interaction of the two variables that set-off step-function change. It is not simply uncertainty *or* threat which set off crises. Rather, it is the combination of the two indicators — the increase in threat, combined with first a decrease and then an increase in uncertainty which create a crisis. Early-warning monitoring can not simply key on threat assessment, it will be necessary to consider the degree of certainty that an agency has in interpreting its outer environment.

Up to this point we have emphasized the initial point in each crisis. But now we need to introduce the concept of equilibrium in order to inspect the hypo-

thesis of a shift in stability conditions in the US views of the environment. We will continue to emphasize the control space (the space defined by threat and uncertainty in the cusp catastrophe), but instead of dealing with initial points as defined by the values for the day three months prior to the recognized initial day of a crisis, we will calculate a yearly average for threat and uncertainty.

Several writers have argued that the crisis environment in which the US finds itself is governed in part by the stability of relations between the United States and the Soviet Union (McClelland (1968), Waltz (1964), and Kissinger (1963)). This argument asserts that as the Cold War period gave way to the detente era it affected, either positively or negatively, the stability of the system. Waltz argued that because it lessened the vigilance of major actors, crises were more likely to be the accidental result of miscalculation and inattention to threat. Kissinger argued that detente reduced the level of threat and permitted competition between super powers to take place without initiating crisis scenarios. Our analysis of a cusp catastrophe allows both analytic and empirical evaluation of these points.

Returning to the familiar figure of the control space for the cusp catastrophe model (Figure 10.4), we can identify hypothetical stability points which cover the nature of the United States-Soviet Union relations over extended periods of time. It is our contention that threat was substantially higher in the Cold War era than it is in the detente period and that uncertainty was higher during Cold War than detente periods. The first assertion is agreed to by both sides of the argument. The second assertion requires more careful thinking. Proponents of stability in the detente era clearly support the argument that uncertainty is less in periods of detente where both sides do not expect violence. The argument is



Hypothesized Cold War
Equilibrium Point

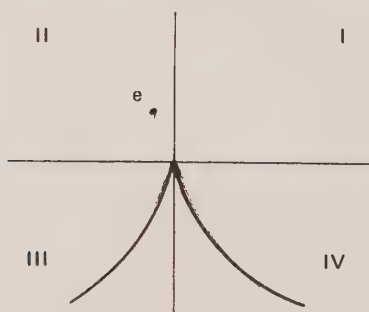
FIGURE 10.4

that the scale of conflict behavior has been limited by the placement of zero's in those values for the likelihood of violence. We contend that Waltz and those concerned over the heightened likelihood of war in the detente era agree with the reduced *perception* of uncertainty but argue that these perceptions are a mirage. That is they create undue optimism and lead to or cause violence to occur because leaders of countries believe that ensuing dangers are not real. Figures 10.4 and 10.5 provides an equilibrium point for both conditions.

In Figure 10.4 the equilibrium points for the Cold War era ought to be in the vicinity of the horizontal axis dividing quadrant 1 and 4. They should demarcate normal to slightly above (below the horizontal line) normal threat. Uncertainty values should remain above normal in this period. In the era of detente, this initial point has moved from the quadrant 1 and 4 border to quadrant 2 signalling a reduction in the perception of uncertainty over Soviet actions with a reduction in the threat perceived from the daily flow of events.

If this placement of the homeostasis points for detente and Cold War perception is correct, and we think both parties of the substantive argument would agree, the dynamics in agency perceptions which lead to crises take on very different trajectories in each period. In the Cold War era crisis paths occur only when movement in perceptions takes on a C shape moving through quadrant 1 and 2 down 3 and across 4. In the detente era the movement is much simpler shift from quadrant 2 to 3 and 4 (Figure 10.5).

In Cold War, crises are initiated by an initial reduction in uncertainty, followed by increases in threat and uncertainty. This makes considerable sense.



Hypothesized Detente
Equilibrium Point

FIGURE 10.5

In the Quemoy-Matsu Crisis, Eisenhower initiated a White Paper clarifying our position in the area just prior to the pre-crisis period. Unfortunately, what was intended as a clarifying statement led to Chinese attempts to understand or test the intent and the results are now history. It is clear that the path is deliberate. Once the trajectory begins its swing towards quadrant 4, there is time and warning. There is also room for misjudgment here. Eisenhower misjudged the situation in the Taiwan Straits. The Berlin crises exhibits the same assertion of new rules of competition followed by testing of reserve on both sides. Thus miscalculation occurs perhaps but only within a much more calculated strategy.

In the detente world, the US can slip into crises without such a drastic reversal in perceptions. Here a simple "slide" into crisis is possible. Any increase of threat could be disastrous, if it was followed by an increase in uncertainty. We can point out two crisis scenario's possible in the detente era which are not present in the Cold War era.

The first set are the quasi-crises inherent in quadrant 2 where a sudden shift in uncertainty with no increase in threat can cause a shift in behavior (either military action or operating procedures). Recall from Chapter IX that these are linear functions of uncertainty and not step jumps of the catastrophe nature. While these quasi-crises are not frequent (4 out of 36), and do not involve US military directly, they are indeed characteristic of the detente period. They reflect in part a growing independence of crises in the less developed world from major power politics. They also signal the emergence of a class of situations in which there is little to be gained by direct US involvement. As a rule, increased monitoring of the situation and some preparation to protect or evacuate non-combatants is considered an appropriate response.

The second crisis set would come about due to a shift in the agencies' world view. If, for instance, there is a translation of the origin such that

$$\begin{aligned}\text{threat } t_2 &= \text{threat } t_1 \\ \text{uncertainty } t_2 &= \text{uncertainty } t_1 + a\end{aligned}$$

there would be a shift of the origin of Figure 10.6a to the position shown in 10.6b. If this happens during a period of increasing threat, crises are likely to occur quite unpredictively since precedence suggests a solvable situation suddenly crosses thresholds that had been quite distant before the shift in perspective. A shift in administration could bring about shifts of this nature in perception. Whether Brzezinski's replacement of Kissinger has indeed led to such a shift in the threshold for uncertainty is difficult to ascertain. The possibility is reasonably easy to entertain, however.

What light can we shed on the stability-unstability arguments of the detente versus Cold War eras? Several points are worth making. Cold War crises are the result of considerable shifts and reshifts in uncertainty. These shifts appear to be

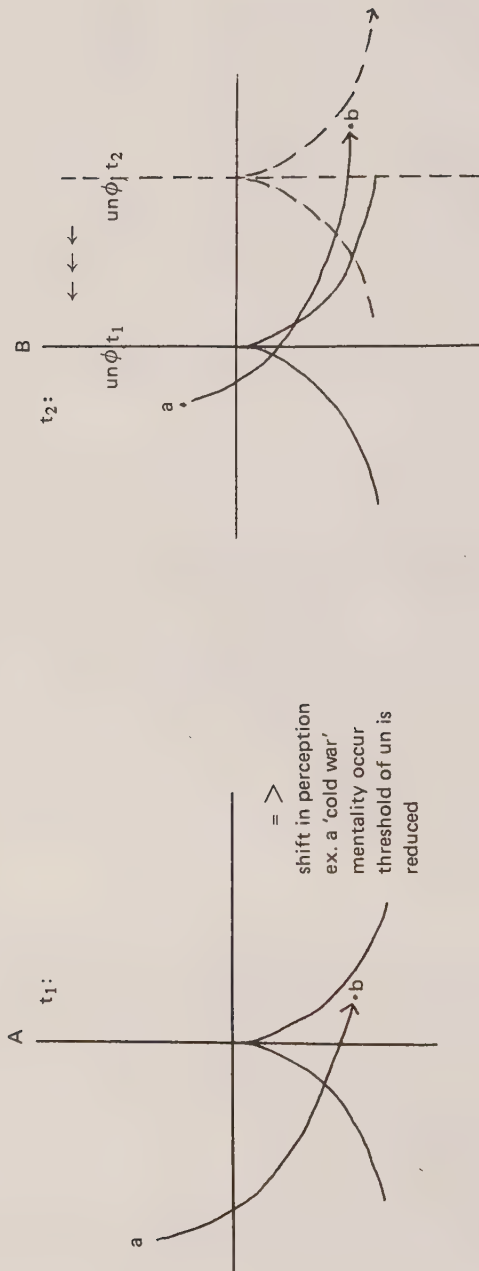


FIGURE 10.6

THE EFFECTS OF A CHANGE IN PERCEPTIONS

the result of cold, hard attempts at asserting a new set of rules for conduct followed by the confusion associated with tests of will. We would expect all crises to occur in the low threat quadrants and to exhibit classic catastrophe theory dynamics. In the detente era, if our placement of the homeostasis positions is correct, there are several opportunities for crisis. The most frequent and straight forward is a shift in perception toward increased threat and uncertainty. The movement is straight forward, but, of course, it can follow a zig-zag path. In addition, one would expect quasi-crises in far-off places not directly involving threats to US positions and crises which stem from a shift in the origin of the perceptual grid agencies used to evaluate crises. These latter are clearly crises enacted by mistake. The straight-forward crisis suggests that disagreements between major powers can trigger crises in a manner which requires less of a deliberate attempt to test the will of the opposition.

It appears that there is room for the miscalculation argument in detente eras. Perhaps not from inattentiveness but from shifts in the basis of perceptions. It also appears that quasi-crises can occur in a detente era which do not lead to the direct involvement of both super powers. Thus, there is an ounce of truth to both sides of the argument. There is both more stability and an increased chance of accidental war. Just how much of these conjectures can be based upon empirical evidence needs to be evaluated. There does not exist a single source of data for perceived threat and uncertainty for the whole post World War II period. We shall have to turn to several data collections.

It is fortunate that Charles McClelland has employed H-rel measurements of acts for this Cold War period when he described crises from 1948 to 1963 (McClelland, 1968). It is possible to chart McClelland's H-rel measures and get a feeling for the general movement of uncertainty over time.

One way to approximate the equilibrium point might be to look at the yearly H-rel measures for the West over some time frame and determine a mean. While this mean is only an approximation, it will give the general direction of movement along the uncertainty dimension.

The H-rel measures developed by McClelland provide information for the 1948-1963 periods which can be used to determine the equilibrium period for the time span 1948-1955. This time period was chosen for two reasons. First, the period 1948-1955 roughly corresponds to the year Stalin or Stalin's ideas clearly controlled the decision making structure of the Soviet Union (Halle, 1960). Coupled with change in the functional aspects of the decision making structure of the Soviet Union came a feeling in the United States of relaxed tensions. Fears by individuals about a World War III were receding and Secretary Dulles' move toward more reasonable coexistence positions were fully recognized by 1955 (Goldman, 1960). The yearly H-rel measures reported by McClelland are found in Table 10.2.

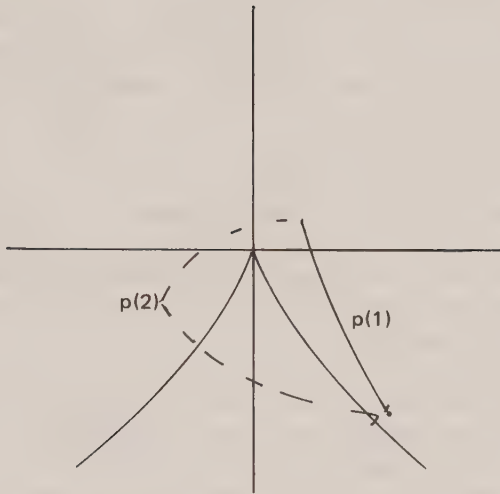
TABLE 10.2
McClelland's H-rel Scores

<i>Year</i>	<i>H-rel</i>	
1948	.927	
1949	.869	
1950	.764	
1951	.899	
1952	.792	
1953	.812	
1954	.628	
1955	.734	
1956	.540	
1957	.278	
1958	.540	
1959	.657	
1960	.782	
1961	.781	
1962	.829	
1963	.658	
		<i>S.D.</i>
46-63	.718	
48-55	.803	.097
55-63	.633	.180

A shift in H-rel measures at 1955 can also be seen in the actual McClelland data. For example, while the mean is .803 for the period between 1948-1953, the mean for the period 1953-1960 is .633. Further, the standard deviation for the first period is .097, while for the second period it is .1800. As the standard deviation increases so does the variation. Since this is the case, the 1948-1953 period represented by the mean is a more stable period with very little deviation in equilibrium. The 1953-1960 period showed a loosening of the lock-in effect of the equilibrium.

The empirical determination of a threat measure for the equilibrium point is much more difficult to identify. Given the national mood during this time period, assume that the equilibrium value for threat, is slightly above T_0 . This would place the equilibrium position in the Southeast quadrant of the control space (Figure 10.7).

Given this equilibrium position, a crisis is somewhat difficult to achieve given the mathematics of the cusp model. For example, path 1 (p1) is not a crisis,



Solid line = $p(1)$ no shift in behavior
 Dotted line = $p(2)$ crisis

FIGURE 10.7

MOVEMENT FROM COLD WAR EQUILIBRIUM

rather it is simply an increment in the increase of conflict of the US. Going back to the earlier partitioning of the control surface, it should be noted that the behavior associated with the equilibrium point is moderately aggressive. The increase in threat does not alter the behavior response of the United States. Likewise the moderate increase in uncertainty only results in a moderate increase in conflict behavior.

In order for a crisis to occur, the US decision making perceptions must follow a path similar to path 2 (p_2) in the preceding figure. Two things are important in this dynamic representation. First, the end situation is identical to the end situation of path 1. Yet path 2 is defined as a crisis while path 1 is not a crisis. The reason this is the case is due to the dynamics of the catastrophe model. The catastrophe model follows what we have called a "delay rule" which stated in its most simple terms says "maintain your current model of behavior until it is absolutely no longer possible." The dynamics of path 1 start in a conflict behavior model and movement South or to the East implies only incremental change.

Second, the way to a crisis is movement first in a Westerly direction, and then in a Southeastern direction. This implies a substantial reduction in H-rel scores followed by an increase in both H-rel scores and threat scores.

Looking at the monthly dynamics of H-rel scores, it is reassuring to note that the H-rel scores seem to follow the correct pattern moving from West to East just before a crisis. For example, in the Taiwan Strait example, the H-rel moved from .240 to over .8 between 1954 and 1955. The Berlin Wall crisis of 1961 follows a similar H-rel pattern.

McClelland's data stopped in 1963. We have to turn to the Andriole and Young (1977) data to identify threat and uncertainty for later periods. The data have been used in Chapter VIII previously and provide information on both uncertainty (H-rel) and threat (tension). The yearly figures suggest a gradual lessening of tension over time and a slight lessening of uncertainty. Thus, we would argue that the equilibrium point has been traveling in the direction we suggest. It is shown in Table 10.3.

In the detente period the situation between the United States and the Soviet Union has shifted. The degree of uncertainty about the acts of the Soviet Union on the part of the United States is reduced in comparison with the early fifties. Likewise, there seems to be a more relaxed feeling towards the Soviet Union, which reduce tension. One would probably define the equilibrium point in the Northwest quadrant of the control space (Figure 10.8).

TABLE 10.3
TENSION AND UNCERTAINTY SCORES
AS COMPUTED FROM ANDRIOLE AND YOUNG DATA

<i>Year</i>	<i>Tension</i>	<i>S.D.</i>	<i>Uncertainty</i>	<i>S.D.</i>
66	56.492	20.663	.513	.138
67	48.408	19.971	.614	.120
68	55.125	13.196	.592	.143
69	35.742	14.313	.630	.070
70	45.683	16.501	.554	.124
71	47.158	26.741	.514	.191
72	34.017	18.619	.601	.114
73	24.225	10.647	.620	.078
74	17.492	10.327	.484	.131
75	28.942	19.143	.448	.189
<i>For Ten Years</i>				
	39.328	21.176	.557	.143
66-70	48.29		.5806	
71-75	30.3668		.5334	

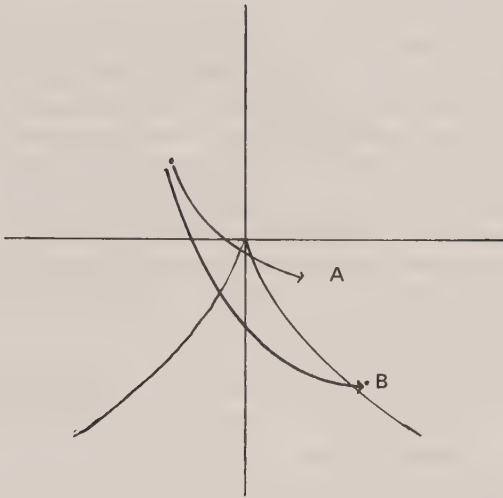


FIGURE 10.8

MOVEMENT INTO CRISIS FROM DETENTE EQUILIBRIUM POINT

The interesting aspect to this equilibrium point is that neither path 1 or path 2 reflect a crisis event by the United States. While the new end point is in the cusp area of the control plane due to the delay rule, the end state is a state of coexistence.

The detente equilibrium reaches a crisis only with tremendous increases in threat and an increase in uncertainty. Points A and points B represent crises from the new equilibrium position. Point A, while having the step-function aspect of a crisis is, a mild crisis, while point B shows a much larger shift in behavior mode. The length of the movement Southeast determines how long the cusp in behavior will actually be.

This movement in a Southeasterly direction provides another point. In a paper on management employing catastrophe theory, Beer and Casti argue that the successful manager broadens the cusp. One way to get at this would be to alter perceptions of situations — thus transferring the uncertainty dimensions in relation to the original scale. But this is much like Zeno's paradox. Zeno's paradox is the famous anecdote about an arrow being shot in the air and traversing space. How does the arrow come to a stop or an end point if on traveling through a continuum it must always pass through a smaller increment of space (thus it is always moving).

By transforming a dimension and broadening the cusp, the decision maker simply is playing an intellectual game talking about different levels of increments. Yet, there may be some truth to the Beer and Casti idea of broadening the cusp. Assuming that a decision maker is not risk averse and is willing to play a game of some type of brinkmanship, movement in a Southerly direction will "broaden the cusp." This point can be seen by comparing point A with point B. By broadening the cusp we mean the decision maker will attempt to increase any distance in the uncertainty direction. In order to do this, the decision maker could allow the threat perception to increase a great distance. This might explain the somewhat irrational acts of some decision makers by attempting to increase the level of threat in a situation.

We have come full circle now. There is indeed good reason to believe our conjecture. The current era is not like the Cold War era. The normal (equilibrium) state of affairs has shifted. This shift changes the nature of crisis initiation considerably. It is no longer the case that crisis initiation is such a complex — deliberate — process. Very simple shifts in the perception of affairs can create crises. The Cold War requirements of crisis initiation seem to imply tests of will, or a question of the rules of the game by their clear cut orchestration of uncertainty. Defense Department concerns with the military dimension of crisis seem to coincide with the political implications of crisis. But in today's more subtle crises where initiations may not always be so complex and where crises are occurring in far off places, which rarely threaten the ability of the US to defend itself, the political implication of crises are quite different and much more important. In this era, the political implications of crises need to be considered carefully. Are conflicts directly relevant to US interests. If they are not, what role in adjudicating the crises seems prudent. When US interests are at stake they are more likely to be distantly threatened; either economically or politically. But now slight shifts in perception can trigger strong shifts in US crisis management procedures. This calls for a careful reevaluation of alternative operating procedures. Are there plenty of non-military actions open to US decision makers? Is information on shifts in political indicators given more credence than military indicators? This is not the place to solve these issues but to suggest that the crises of the 1970s-1980s demonstrate a clear shift from the parallelism of military and political interests so characteristic of the Cold War.

Notes

1. While all three agencies are located in the same quadrant, they have different values. It was thought a necessity to divide the control surface into quadrants for qualitative reasons. The zero points are theoretical threshold points. The zero points define qualitative behavioral difference in the model. In particular, the zero point for threat determines the beginning of the cusp area. The zero point for uncertainty determines the location of the cusp line. By looking at locations of perceptions in each quadrant, we can determine the closeness to a crisis (step-function change) and the behavioral characteristic of the agency.
2. This dynamic only applies to those situations in this set which showed the step-function change associated with the crossing of the bifurcation line in quadrant 4.

Chapter XI

Conclusions/Executive Summary

The research reported on in this manuscript attempts to evaluate the images employed in managing crises on the part of the major agencies of foreign policy in the United States: the State Department, the Defense Department, and the Central Intelligence Agency. The research is based upon the belief that in order to make the early warning process work better:

- 1) we must know more about the relevancy of agency images in interpreting events and assigning estimates of threat, the time available in which to make decisions, and the degree of uncertainty over the occurrence of immediately preceeding events;
- 2) we must have a clear understanding of the impact of shifts from non-crisis to crisis modes of behavior upon the management of crises;
- 3) we must understand the implication of shifts in the political climate of international affairs which effect both of the above.

While we believe that this research has some rather striking policy implications, it is important to point out that the interpretations are, in turn, dependent upon a major new theoretical foundation. This foundation represents a striking shift in emphasis from much of the current crisis literature in academic circles, but it is one in which we are highly confident.

Early warning is a continuing process as Tom Belden (1977) asserts. It is one which must take place in the face of:

- 1) incomplete definition of goals and purposes,
- 2) incomplete determination of the conditions under which we must operate,
- 3) a very large number of alternative interpretations (possibilities).

In order to study these aspects of the early warning process and to extend the warning time, our concerns must shift from charting the external activity present in the outer environment to an attempt to model the internal structure of information processing in the United States. Useful models of governmental information processing must go beyond preserving input-output relationships. They must attempt to characterize *the manner in which information is transformed into interpretations* of the environment and the recognition process which triggers this nation's response to crises.

An underlying assumption made in this analysis is that the discrete actions of nations are not events: rather chunks of actions are aggregated by analysts to represent artificially defined events. This perspective is derived from Riker (1957, p. 57) who argues:

Faced with the complexity of continuous reality, humans understand it by breaking it up into pieces. Although a continuous reality cannot, by definition, consist of discrete motions and actions, we imagine starts and stops. What lies between the starts and stops we call events. Events are motion and action separated out of the continuous reality by the verbal position of boundaries. So accustomed are we to separating out events by verbal processes that we often lose sight of the subjective character of the separation. We tend to regard the event as an objectively differentiated portion of reality.

In accepting this position, we acknowledge (as Andriole, 1975, p. 4; and Rossa, 1977, p. 8, recognize) that events are operational tools of the human mind which aggregate action sequences according to some mental image in an attempt to understand the dynamics of foreign affairs. But these images are distortions of reality — distortions in two respects: they are artificial aggregations of the individuals who comprise an agency and they are idiosyncratic interpretations. Our model attempts to identify and account for these distortions by employing a perspective involving the mapping of perceptions onto interpretations and eventually onto responses.

The adaptability characteristics of a nation are based upon perceptions of the outer environment. Perceptions act as a link between the outer environment and the complex of behavioral responses of a given nation. Any definition of crisis must reflect this mapping between behavior and perceptions. It must be capable, also of reflecting the impact of changes in perception.

Essentially the argument behind our model is that international actors are disturbed by the outer environment as they perceive it. This perception of an outer environment as a disturbing mechanism is important. The dichotomy between the inner and outer environment are best delineated in Herbert Simon (1969). Simon argues that there are two important modeling properties which are a result of this dichotomy:

- 1) given such a dichotomy we can minimize our assumptions about the inner environment;
- 2) we can also look at a few characteristics of the outer environment; not all the details are important in describing the adaptability of the system.

We argue that the charting of disturbances in the outer environment affects movement of some kind in the actor's perception of the outer environment. This is not a very earthshaking assumption. An actor's information sources is on the whole his main instrument for explaining disturbances in his environment.

Further, we argue that there are three very important variables that define an actor's perception of the situation. These perceptions are the degree of threat,

the degree of uncertainty and the amount of decision time that an actor perceives as a result of disturbances in its outer environment. These variables incorporate two ideas about crisis. First, their identification follows a number of previous authors' interest in perceptions and their effect on behavior during crisis (Hermann, 1969; Holsti, 1972). Second, it postulates that the degree of uncertainty reflects a concern with the degree of competence agencies have in their interpretation of a signal. Uncertainty provides an important communications aspect for speculation of crises. The importance of decision time is best exemplified in the special issue of the *International Studies Quarterly* (1977) devoted to early warning aspects of crises. The incorporation of these two concepts with the concept of threat is an attempt to reflect the goal aspects of a nation acting as a system. The question is, given certain existing perceptions of the outer environment, if a nation wishes to avoid crises, of what types of emergent interpretations of hostility must it be particularly careful?

It is our contention that a crisis is operationally defined by policy makers as a shift in behavior triggered by particular combinations of threat, decision time, and uncertainty. We see perceptions (of threat, decision time, and uncertainty) mapping onto behavior. It is the situation and the perceived context which leads to crisis behavior. But the mapping is not a simple linear mapping. We believe that simple inputs of changes in perceptions lead to radical change in behavior during periods of crisis. If it is true that the impact of crisis on behavior can be likened to a step-level function of perceived hostility, then, what most of the field has been doing empirically can not be expected to lead to a clear understanding of crisis recognition. Rather our position would suggest that most tracking or chartering is a waste of time in a policy domain unless it is combined with theoretical models which anticipate shifts of the nature we believe exist. The mere identification of shifts may be of passing interest to academics but it is already a fact of life to a policy analyst who wishes his friends in the academic community could have forewarned him of these shifts.

What we have reported on here is the results of a three-year research program to evaluate the utility of catastrophe theory in international relations. Much of what has been presented here is an attempt to combine a series of mathematical equations with some carefully thought out substantive definitions into a set of theoretical derivations and to identify empirical extensions of the implications. In the theoretical derivations and empirical examinations of this research we have developed a number of conclusions which not only demonstrate the power of our theory but underscore the policy focus of our efforts. The results can be formulated in terms of the three divisions of the introduction:

- the decision making system,
- the shift in structure from the day to day to crises
- the foreign affairs environment and shifts in that environment over time.

A. The Decision Making System

Our findings caution any President of the United States not to rely too heavily upon a single agency in anticipating or interpreting crises. While he can anticipate a comfortable degree of correlation between agency interpretations of threat, decision time and uncertainty, he cannot expect agreement on the underlying causes of the scores on each variable. Nor can he expect all the agencies to supply him with equally timely information. More specifically, threat appears contagious regardless of which agency sees it first or why that agency claims the United States has been threatened. This is the classic problem of crisis demarcation. Simply put, it is the "chicken little" problem in the American foreign policy bureaucracy.

Our research into agency interpretations (Chapter IV) found several distinctions between the agencies analyzed. The State Department interpretations reflect a fairly consistent concern for traditional and somewhat legalistic concepts including regional and world destabilizing influences, unsettling influences in alliance and related matters as well as politically violent issues requiring great diplomatic manipulation and consideration. Central Intelligence Agency interpretations reflect less concern for regional balances, remaining largely concerned with a country's specific issues or interpretation. There is also evidence of a more long run interest in world events with a sort of balance sheet approach to US interests; as the CIA defines them. That is, the CIA seems to anticipate events and/or situations as either plus or minus to overall US interests in a sort of strategic (political) chess match. Finally, the CIA seems to share a concern with the State Department for maintaining the status quo; a positive orientation towards maintaining the political map.

The Defense Department interpretations reflect a general concern for the US strategic posture tending to interpret events as directly affecting US interests and integrity. A large part of their concerns centers on the far flung dispersion of US military personnel and material interests and/or commitment and concern for our ability to protect these assets. In another sense there is greater concern in the Defense images for the material versus the intrinsic, than is found in CIA or State Department interpretations. For example, conflict is more likely to be seen as threatening to US owned or controlled assets than as destabilizing to a region or as potentially threatening to friendly leadership elites.

Analyses of how the agencies interpreted crises led to further distinctions. The crises of the 1965-1975 period appeared to interest the US because they implied a threat to US personnel or property or because there was a confrontation between two nations in which the US had some interests. United States' interests were defined to include concern over major power conflicts, the upsetting of the status quo, or in many cases a threat to the normal diplomatic procedures of the current international order.

By and large the State Department was most sensitive to changes in the state of affairs in the international environment. These shifts were instrumental in terms of the State Department's sensitivity in interpreting events. This agency fluctuates most frequently in response to changes in indicators, to see more threat, less certainty and more of a demand for quick action than either Defense or CIA. Is the State Department image of the world more accurate? We believe it is if the US is to be sensitive to the territorial integrity of others, to threats to the peace, to the security of the sovereign states and concerned with American citizens' property and economic interests abroad.

What are the other interpretations? How do they stack up in this game of cards? Not so well we feel. If the US position is to be one of supporting the status quo, of being sensitive to the need for quick action now to maintain or enhance alignments in the future, then the CIA image is appropriate. It was indeed potentially relevant to a large class of crises. To some extent the CIA image is accurate. It is sensitive to stability and the concomitant implications of stability for US interests around the world. Its willingness to equate these shifts in the status quo in many domestic situations to threats to the United States and to call for action now to prevent such shifts gives pause for concern, however. Finally, the Defense Department image of many situations seems simply irrelevant in today's world.

The Defense Department wants to interpret crises in terms of major power confrontations, direct military conflict with United States forces, and tests of the United States fighting will. Since this is its image, it sees little threat, uncertainty, or need for action. Perhaps it is appropriate to let the giant sleep. We are concerned, however, that this image has a secondary tendency to call for military action to protect US citizens property and economic interests and as such seems to play a pivotal position between the other two agencies interpretation. In the Cold War era the Defense image was not only appropriate it was instrumental in preventing the outbreak of war. But in today's world where crises are quite different, we are concerned. If our interpretation of the Defense images are correct and they are left to stand as they are, the final administration's interpretation of the implications of crises-like situations can be affected by an image that shows little relevance to today's world and that calls for quite inappropriate over reaction.

When we sought patterns in agency interpretations of threat, decision time and uncertainty, we found additional interesting parallels. Threat estimates of the three agencies appear to be highly correlated. Thus there is a pattern in threat estimates over time which is similar across all three agencies. The importance of this cannot be understated. As we and others argue (McClelland, 1974), threat has lacked an important place in the theoretical perspectives on conflict. Our results indicate two things. First, threat is definitely an important

perceptual element of crisis watch officers and, secondly, the basis for identifying threat is *not* similar from agency to agency. This may not be as bad as it appears at first. If the agency images are controlled by administrative assignments then different interpretations may be due to different assigned responsibilities. These different role-oriented perspectives, while affecting what aspects of the international arena agencies are looking at, do not appear to affect estimates of threat.

Similar correlations between agency interpretations do not occur for uncertainty estimates, however. Thus new information has a very different impact on each agency. For some it is helpful in reaching decisions. For others it is unnecessary, and yet for others it is simply confusing. An intriguing partial correlation was found between agencies estimates of uncertainty however. In periods of high threat, there is a correlation between threat and uncertainty. When events take a turn for the worse, the agencies do coordinate their interpretations and they do see the situation as becoming more uncertain. The President can expect large differences of opinion between agencies when situations are not threatening. But, he should expect convergence in a crisis. This intriguing finding also contains a warning: watch out for disagreements in estimates during periods of intense threat. When a President most needs to know the reason for division it may be impossible for him to ascertain the basis for disagreement since the basic interpretation of the causes of a crisis are different. The ringing conclusion throughout the pattern comparisons was that threat is clearly contagious. Agencies differ in the speed with which they perceive increased threat. But once one agency has decided it saw a problem, other agencies climb on the bandwagon all too frequently. As threats mount, the solitification or lock-in of other perceptions follows suit. It is impossible to gauge the accuracy of estimates in our research. Our analysis clearly signals the need to analyze the accuracy of such shifts in perspectives and to allow a President to seek information about the basis for estimates each agency provides him.

B. Aspects in the Shift to Crisis Preparedness

When we implant the three perceptual variables of threat, decision time, and uncertainty, into a model of crisis warning and analyze the American response to crises (the shift to crisis management from perception), we find evidence to corroborate our findings on perceptions. In this area, our findings were derived from both theoretical (Chapters VII and VIII) and empirical analyses (Chapters VIII and IX).

First, our model derived some disquieting conclusions. The derivations highlighted the common sense awareness that once a crisis has been instigated, it is

not an easy matter to go back the way we came. We can expect some resistance to the causation of conflict in general as a function of decision makers' lack of decision time and uncertainty about the meaning of events.

Another disquieting aspect of the model was the stress placed upon uncontrolled behavior. In situations of short decision time that are high in uncertainty, it is quite possible for nations to lack the command and control necessary to manage the actions of the military. The model suggests that the tendency to be caught with an uncontrolled need to respond militarily is the greatest in low threat periods of the present detente era. Our derivations suggest that during high tension levels, the day-to-day alertness of the command and control system is able to handle the emergencies but during low threat periods, control can slip below minimum levels of alert needed to wisely control military activity.

Essentially our model is an attempt to put the output generating function of catastrophe theory into a substantive model of crisis management. In the process of doing that, several implications in terms of the behaviors of nations being a function of combinations of threat and uncertainty were generated. These can be summarized as follows:

- A - If threat and uncertainty are below normal ($th < \phi$, $un < \phi$) then behavior is co-operative (i.e. it rests in quadrant 2 of Figure 11.1).
- B - If threat is greater than normal ($th > \phi$) and uncertainty lies in its intermediate ranges ($un_L \leq un \leq un_h$), then behavior would be of an intermediate mode (i.e. slightly stressful but not conflictual).
- C - If threat is below normal ($th < \phi$) and uncertainty is high ($un < un_h$), behavior is conflictual.
- D - If threat is normal or less ($th \leq \phi$) and uncertainty is normal ($un \leq \phi$) but the joint values of threat and uncertainty stay outside of the curve in quadrant 3: ($th^3 + 27un^2 > 0$), behavior is cooperative.
- E - If threat is normal or less but the joint score of threat and uncertainty places the situation inside of the angle formed by the curves in quadrants 3 and 4: ($4th^3 + 27un^2 \leq 0$), then behavior can be either conflictual or cooperative.
- F - If threat remains in this range, but the joint summation of threat and uncertainty forces the perception to cross the line ($4th^3 + 27un^2 > 0$), there is a crisis.
- G - When the situation is in quadrant 4 or more to the right of the curve ($4th^3 + 27un^2 > 0$), behavior is conflictual.

The early empirical tests of these shifts in crisis implications highlighted the complexity of the crisis initiation process. There is no clear type of movement that demarcates a move to crisis. Crises occur when threat is increasing (the Pueblo incident) as well as when threat is decreasing (Arab-Israeli crisis, 1967). The absolute level of threat is, of course, always above some threshold and uncertainty must be increasing.

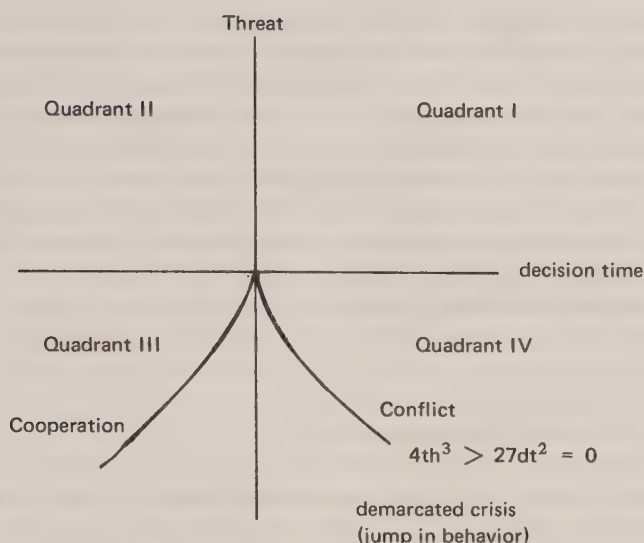


FIGURE 11.1

THE CONTROL SPACE

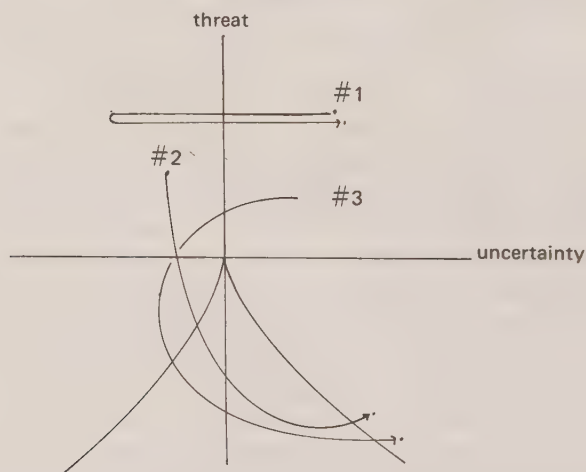
Empirical evidence from the test of the crisis shift model highlights the importance of the CIA in early warning. That agency's image demonstrates a clear tendency to see further down the road than either the State Department or Defense Department. The State Department is most inclined to be surprised by events in the international system. They more frequently jump from daily routines directly into new crisis modes of operation.

The timing at which agencies become aware of a crisis differs significantly. Our findings suggest that conferencing might be a very good thing between watch officers. But caution is needed also. The early agency needs to notify superiors as early as possible. The national command authority needs several agency perspectives to assure timely warning and a clear picture of what is the underlying cause of threat. If what we suspect is true, that the underlying interpretation of threat is a function of the relative role each agency is being asked to fill, then early notification of threat is one of the few opportunities higher level decision makers will have in sorting out the role defined reasons for these perceptions from their actual outer environmental disturbances. When one looks at the order in which agencies exhibit the step-function change into crisis management, the Defense Department's role in shifting to crises becomes quite interesting. There are a few crises in which Defense is the first agency to warn of

the potentiality of a crisis. In our analyses Defense was the early warning instrument in Cyprus, Cambodia 1973, and Laos. We credit Defense sensitivities in these areas to previous involvements and prior knowledge. In no situation however is Defense Department the first agency to react to its outer environment by a step-function change into crisis management.¹ Thus it is the warning agency in only three crises, and it is never the first crisis interpreter. In fact, in some instances, the Defense Department does not show a step-function change for two months after the other agencies show the change (Jordan, for instance). We have attributed this lack of shift to crisis management on the part of the Defense Department not to one of being unprepared militarily but of being unable or unwilling to shift to crisis unless there are clear roles for armed forces.

C. Shifts in the Nature of the Environment

Our analysis of the outer environment as perceived by the major agencies involved in the foreign policies of the US suggests that in the period 1965-1975, the majority of crises began in what we have termed quadrant 1 the high uncertainty, low threat contingency area (see Figure 11.2). We found this quite



- #1 — quasi crisis
- #2 — increasing uncertainty and threat
- #3 — oscillatory uncertainty with increasing threat

FIGURE 11.2

PREDOMINANT MOVEMENTS IN CONTROL SPACE

consistent with substantive interpretations of the international system characterized by reasonably peaceful exchanges between nations and a high level of anarchy controlling the relations between those nations. Our analysis also found a number of situations of a quasi-peace, quasi-war nature. Thus, in much of the Middle-East the distinction between war and peace is at best a matter of convenience in definition. In these situations conflict is the predominant mode of operation and whether the nations are in a crisis or not is the result of minute shifts in uncertainty or threat as nations or agencies perceive them. While we have been unable to find a single perceptual audit trail preceding all crises, we have demarcated several oscillatory paths to crisis which characterize the 1965-1975 period. It appears quite obvious that there are conditions which never exist in that period. The tracks that did exist show several crises initiating scenarios. The three most prevalent are the (1) non-threat crisis or quasi-crisis as we have termed it, the situation of a (2) continually worsening nature which we have called the gradual slide to crisis situation in which perceptions move from reasonably low threat, low uncertainty to progressively more threat, more uncertainty and (3) more determined pattern of oscillation between high uncertainty, low uncertainty and, high uncertainty again. In this last situation, threat increases gradually over the whole oscillatory pattern of uncertainty (Figure 11.2).

In looking at longer term shifts in perception, we have found three or four equilibrium points in the perception of the outer environment on the part of the United States. Here we suggest that from 1948 in the height of the Cold War to the current detente era we have seen a progressive lessening of both threat and uncertainty. Today's expected behavior in the relations between the United States and the Soviet Union is of a situation of reasonably low uncertainty and reasonably low threat. From this position crises occur by a concomitant increase in threat and uncertainty. We concur that the current era is *not* like the Cold War era where crises were initiated with an initial reduction of uncertainty and then a concomitant rise in threat and uncertainty. The normal state of affairs has shifted. This shift changes the nature of crisis initiation considerably. It is no longer the case that crisis initiation is such a complex/deliberate process. Very simple shifts in the perception of affairs can create crises today. The Cold War requirements of crisis initiation seem to imply tests of will or a question of the rules of the game by a clear-cut orchestration of uncertainty. Defense Department concerns with the military dimension of crisis seem to coincide with the political implications of crisis during a Cold War era. But in today's more subtle crisis era, where initiations may not always be so complex and more crises are occurring in far-off places where US military preparedness is rarely threatened, the political implications of crises are quite different from the military implications of crises. In this era the political implications of crises need

to be considered carefully and independently from their military implications. Are conflicts directly relevant to US interests? If they are, what role in adjudicating the crisis seems prudent? When US interests are at stake, are they more likely to be distantly threatened; either economically or politically? The realizations of these differences between the detente era and the Cold War era calls for careful re-evaluation of the alternative operating procedures for managing crises. We must re-evaluate the options and significantly enhance the nonmilitary options open to US decision makers. The crises of the 1980's are not likely to be crises which can be solved by simple military actions or the threat of actions. They are likely to be low threat, slowly evolving quite uncertain situations. These are the kind of situations to which the United States' crisis management is least responsive. All of our analysis suggests the US agencies involved in early crisis periods need to be able to control the situation better in far-off places during periods of minor threat to US interests.

Throughout our analysis, we have returned repeatedly to constant themes. The first is that **THREAT IS CONTAGIOUS**. Everywhere the threat variable was analyzed, it was found to be the single most important trigger in understanding the government shift to crisis management modes of operation. We have also found that as soon as one agency finds threat in a situation, the other agencies rapidly recognize threat. This "chicken little" phenomenon in crisis warning is encouraging in that it rarely happens in situations which were not crisis. It is discouraging, however, when one turns to the actual explanations given for the levels of threat estimated. These explanations rarely converge between agencies.

The second strong conclusion of this work is **THE NEED TO SHIFT THE DEFENSE DEPARTMENT IMAGES INVOLVED IN EARLY WARNING**. We are not advocating a complete change in the sensitivity of Defense to military threats to the United States. Rather we argue that the Defense image would be enhanced by the addition of political indicators and political interpretations. Such an addition would significantly increase the repertoire of Defense sensitivities. We would also argue that there is a need to isolate elements of crisis interpretation such that Defense can indeed perceive a situation of high political importance to the United States but of low military threat to its ability to defend itself.

Another theme is **THE NEED FOR PROCEDURES WHICH GUARANTEE CONTROL IN THE SHIFT TO CRISIS**. In crises which occur in far-off places, where the major conflict is civil or between two minor military powers, the threat to the US is minimum (at least in terms of short-term contingencies). But these situations which inherently do not concern the United States directly, have been ripe for individual agency action without coordination from above or without the initiation of the National Command Authority. This problem is most

pronounced in military crisis where the signals appear most confused. An example of this sort of opportunity was present in the Korean tree pruning crisis where we saw situations of reasonably low threat blown out of proportion in the Defense estimates.

Another important theme running throughout our analysis has been THE NEED FOR MULTIPLE IMAGES IN ORDER FOR THE NATIONAL COMMAND AUTHORITY TO HAVE A MORE ACCURATE INTERPRETATION OF THE IMPLICATION OF THE SIGNALS FROM THE OUTER ENVIRONMENT. In a large part images appear to be controlled by the roles the administration is asking each agency to fulfill. We see that interpretations are rarely consistent between agencies but that the perception of threat appears well correlated. Thus, a full understanding of the reasons for the interpretation of threat require an artistic mix of the interpretations being given by the agencies. Another important reason for advocating multiple images is the clear finding from our research that the early bird is not always the same agency. Thus multiple images of the type used in the 1965-1975 period have a tendency to allow particular national security interests to trigger the crisis alert for very different reasons.

The final set of findings speak to the importance of UNDERSTANDING THE DIFFERENCES BETWEEN THE DETENTE ERA AND THE COLD WAR ERA. The crises of the detente era are more difficult to anticipate, forestall, or to interpret. Crises management, if it is to be successful in detente, must be more sophisticated than it was during the Cold War era. From what we have shown in our analysis, the need for crisis management is at least as great today as it ever has been. But the preparedness so characteristically associated with the Cold War era is not appropriate for detente.

Our analyses and our conclusions call for two programmatic adjustments in the current state of research and policy derived implications. The first major implication is that WE MUST FOREGO CHARTING EXERCISES OF EVENTS IN THE INTERNATIONAL SYSTEM, AND SHIFT OUR FOCUS TO THE INTERFACE BETWEEN DISTURBANCES IN THE OUTER ENVIRONMENT AND THE CONCOMITANT INTERPRETATIONS IN AGENCIES CHARGED WITH MONITORING THAT ENVIRONMENT. We need to understand more clearly the interface between the environment and US interpretations of that environment. Clearly this means we are in need of more theory, more analysis, and more normative debate into the appropriate images for managing a changing world. We believe that this debate requires us to re-evaluate what the role of major nations ought to be in the future and what their concerns should be. The second implication derived from this research is that POLITICAL AND ECONOMIC INTERPRETATIONS OF THE ENVIRONMENT MUST PLAY A MORE IMPORTANT ROLE IN THE DESIGN AND DEVELOPMENT OF

INFORMATION COLLECTION SYSTEMS IN THE FUTURE. We believe that the research reported on here shows that both the perceptual basis for making decisions about threat in the international environment and the mechanisms for shifting US foreign policy operations from a day-to-day mode of operating to a crisis mode of operating require far more than the development of multiple computer message handling capacities. It requires a shift in the way that information is interpreted. This shift begins a better understanding of images held by the men and women who make up the foreign policy bureaucracy.

Notes

1. Readers are referred to Chapters VII and VIII for the differences between early warning and crises periods.

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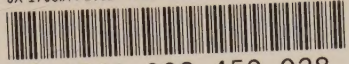
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CRISIS WARNING

THE PERCEPTION BEHAVIOR INTERFACE

**WARREN R. PHILLIPS
AND RICHARD RIMKUNAS**

THE OPERATION OF AMERICAN FOREIGN POLICY IS ACUTELY DEPENDENT UPON THE ABILITY OF GOVERNMENT TO RECOGNIZE CRISES AND QUICKLY RESPOND TO THEM. THIS BOOK ANALYZES THE OPERATIONAL PREPAREDNESS OF THE DEFENSE DEPARTMENT, THE CIA AND THE STATE DEPARTMENT, AS EVIDENCED BY THEIR TRACK RECORDS OVER THE LAST FIFTEEN YEARS, AND MAKES A SERIES OF SUGGESTIONS FOR CHANGES IN PROCEDURES OF CRISIS RECOGNITION. IT ALSO SERVES AS A TEST ON THE USE OF SCIENTIFIC METHOD IN THE STUDY OF AMERICAN FOREIGN POLICY, COMBINING SUBSTANCE AND FORMAL SCIENCE IN A NOVEL, NONTRADITIONAL WAY.

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THE CRISES OF THE 1960'S. THE NATURE OF THE ENVIRONMENT.

CONCLUSIONS/EXECUTIVE SUMMARY.

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